

**EOSDIS Core System Project**

**ECS System Acceptance Test Report for  
Release A, Volume 3: Earth Observing  
System (EOS) Operations Center (EOC)  
for the ECS Project**

December 1996

Hughes Information Technology Systems  
Upper Marlboro, Maryland

# **ECS System Acceptance Test Report for Release A, Volume 3: Earth Observing System (EOS) Operations Center for the ECS Project**

**December 1996**

Prepared Under Contract NAS5-60000  
CDRL Item #071

## **APPROVED BY**

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EOSDIS Core System Project	

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Upper Marlboro, Maryland

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# Preface

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The content of this document defines the acceptance test report for the Flight Operations Segment (FOS). It addresses results from the FOS Release A Formal Acceptance Test which took place from November 11 to November 26, 1996 at the Goddard Space Flight Facility (GSFC) EOS Operations Center (EOC) - Building 32.

Included are detailed results for the entire suite of FOS tests conducted during the FOS Formal Acceptance Test Phase, including thread tests, end-to-end-tests, hardware tests, and confidence tests. It defines test results and identifies deviations to procedures, problems encountered and NCR status. Thus, this document addresses the data item descriptions for CDRL 071 - 412/VE2.

This document is a contract deliverable with an approval code 2. As such, it does not require formal Government approval, however, the Government reserves the right to request changes within 45 days of the initial submittal. Once approved, contractor changes to this document are handled in accordance with Class I and Class II change control requirements described in the EOS Configuration Management Plan, and changes to this document shall be made by document change notice (DCN) or by complete revision.

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# Abstract

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This document describes the FOS Release A Formal Acceptance Test status as reported at the FOS Release Readiness Review (RRR). It focuses on providing test results from various perspectives: FOS subsystem, level 4 requirements, Requirements by Release (RBR), and Interface Requirements Document (IRD) requirements.

Included are detailed results for the entire suite of FOS tests conducted during the FOS Formal Acceptance Test Phase, including thread tests, end-to-end-tests, hardware tests, and confidence tests. It defines test results and identifies deviations to procedures, problems encountered and NCR status.

**Keywords:** I&T, Results, RRR, CSR, Integration, NCR, FOS, Test, Requirements, RBR, Pass, Fail

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## Appendix B. FOS Level 4 Requirement Test Status Matrix

## Abbreviations and Acronyms

# **1. Introduction**

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## **1.1 Identification**

This document is the final version of the ECS System Acceptance Test Report for Release A, Volume 3: Earth Observing system (EOS) Operations Center (EOC), which is item 071 on the Contract Data Requirements List (CDRL) and defined by Data Item Description (DID) 412/VE2 under contract NAS5-60000.

## **1.2 Scope**

This document summarizes the FOS acceptance test results for the Release A Formal Test period as presented at the FOS RRR.

In particular, the ECS System Acceptance Test Report for Release A, Volume 3: Earth Observing System (EOS) Operations Center (EOC) details the FOS system, as well as reporting on compliance with the Release A requirements as specified in the Functional and Performance Requirements Specification (#423-41-02), non mission-specific level 4 requirements as specified in the FOS Requirements Specification for the ECS Project, Volume 1 (#304-CD-001-003) and mission-specific Level 4 requirements as specified in the FOS Requirements Specification for the ECS Project, Volume 2 (#304-CD-004-003).

This document is under the ECS Configuration Control Board (CCB) and is the final release A submittal. Changes to these volumes must be approved by this ECS CCB prior to inclusion in the document.

This document reflects the February 7, 1996 Technical Baseline maintained by the contractor configuration control board in accordance with ECS Technical Direction No. 11, dated December 6, 1994.

## **1.3 Purpose**

This document describes the FOS Release A Formal Acceptance Test status as reported at the FOS RRR. It focuses on providing test results from various perspectives: FOS subsystem, level 4 requirements, Requirements by Release (RBR), and Interface Requirements Document (IRD) requirements.

## **1.4 Status and Schedule**

The submittal of DID 412/VE2 meets the milestone specified in CDRL of the National Aeronautics and Space Administration (NASA) contract NAS5-60000.

## **1.5 Document Organization**

Section 1 provides the scope and document organization.

Section 2 provides a list of related documents, which were used directly or indirectly in the preparation of this document.

Section 3 defines the FOS Release A Formal Acceptance Test results. It includes a brief description of the status of each FOS subsystem, description of test status for each test pass, requirement pass/fail status information, and NCR status.

The section Abbreviations and Acronyms contains an alphabetized list of definitions for abbreviations and acronyms used in this volume.

## 2. Related Documentation

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### 2.1 Parent Documents

The parent documents are the documents from which this FOS Integration and Test Reports' scope and content are derived.

304-CD-001-003	Flight Operations Segment (FOS) Requirements Specification for the ECS Project, Volume 1: General Requirements
304-CD-004-003	Flight Operations Segment (FOS) Requirements Specification for the ECS Project, Volume 2: AM-1 Mission Specific
322-CD-010-003	Flight Operations Segment (FOS) Integration and Test Procedures for the ECS Project, Release A
324-CD-004-001	Flight Operations Segment (FOS) Release A Integration and Test Reports for the ECS Project, Release A
423-41-02	Goddard Space Flight Center, Functional and Performance Requirements Specification for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS)
423-41-003	Goddard Space Flight Center, EOSDIS Core System (ECS) Contract Data Requirements Document

### 2.2 Applicable Documents

The following document is referenced within this document, or is directly applicable, or contains policies or other directive matters that are binding upon the content of this volume.

319-CD-001-003/ 402-CD-004-001	Flight Operations Segment (FOS) Release Plan and Development Plan for the ECS Project
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### 2.3 Information Documents

#### 2.3.1 Information Documents Referenced

The following documents are referenced herein and amplify or clarify the information presented in this document. These documents are not binding on the content of the FOS Integration and Test Reports for the ECS Project.

194-201-SE1-001	Systems Engineering Plan for the ECS Project
194-202-SE1-001	Standards and Procedures for the ECS Project
193-208-SE1-001	Methodology for Definition of External Interfaces for the ECS Project

308-CD-001-006	Software Development Plan for the ECS Project
194-401-VE1-002	Verification Plan for the ECS Project
194-415-VE1-002	Acceptance Testing Management Plan for the ECS Project
501-CD-001-004	Performance Assurance Implementation Plan for the ECS Project
194-502-PA1-001	Contractor's Practices and Procedures Referenced in the PAIP for the ECS Project
604-CD-001-004	Operations Concept for the ECS Project, Part 1--ECS Overview
604-CD-002-003	Operations Concept for the ECS Project, Part 2B--Release B
604-CD-003-002	Operations Concept for the ECS Project, Part 2A--Release A

### **2.3.2 Information Documents Not Referenced**

The following documents, although not referenced herein and/or not directly applicable, do amplify or clarify the information presented in this document. These documents are not binding on the content of the FOS Integration and Test Plan for the ECS Project.

104-CD-001-004	Data Management Plan for the ECS Project
193-105-MG3-001	Data Management Procedures for the ECS Project

### 3. FOS Release A Formal Test Results

This section contains detailed results for the FOS Release A Formal Test Period, held from November 11-26, 1996 at the ECS facility at the Goddard Space Flight Center (GSFC), Greenbelt, Maryland.

#### 3.1 FOS Test Program Context

Following successful completion of the FOS Consent to Ship Review (CSR), the FOS software is installed at the EOS Operations Center (EOC) facility at GSFC and made available for formal acceptance testing. At this time, the FOS Formal Test Phase is begun; formal acceptance testing includes the execution of functional thread tests designed to verify requirements (FOS level 4, IRD and RBR requirements) and end-to-end tests designed to ensure concurrent operational functionality. Formal testing also includes the execution and reporting of all regression tests executed following patch deliveries. All tests conducted during this period, including thread, end-to-end, hardware, and confidence tests are currently defined in the FOS Release A Integration & Test Procedures document (322-CD-010-003). Results reported in this document are a direct result of test procedure conduct using the test suite as shown in Figure 3.1-1 and coincide with the test case list provided in Table 3.1-1.

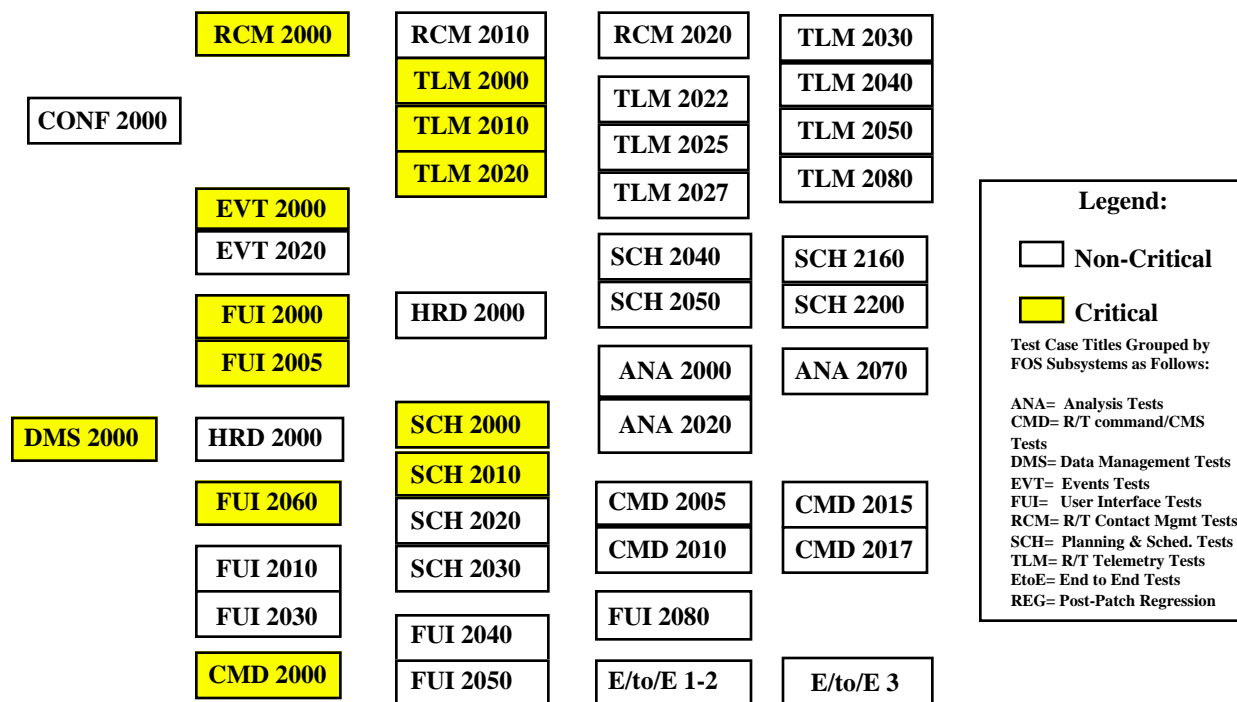


Figure 3.1-1. FOS Release A Test Suite & Test Order



**Table 3.1-1. FOS Release A Test Suite (1 of 2)**

<b>Test Title</b>	<b>Test Name</b>	<b>Associated Thread</b>
DMS-2000	Database Ingest, Format & Validation	Database
EVT-2000	Event Message Processing	Real-time Events
EVT-2020	Event History Request	Real-time Events
FUI-2000	Control Window Manipulation	General User Interface
FUI-2005	ECL Directives	User Interface Directives
FUI-2010	PROC Builder	User Interface Directives
FUI-2030	Request Preplanned Command PROC	User Interface Directives
FUI-2040	Time Selector	User Interface Tools
FUI-2050	HELP Tool	User Interface Tools
FUI-2060	Realtime Alphanumeric Display	User Interface Tools
FUI-2080	Screen Management	User Interface Tools
SCH-2000	Activity Definer Tool	Planning & Scheduling
SCH-2010	BAP Definer Tool	Planning & Scheduling
SCH-2020	General Scheduler & Timeline	Planning & Scheduling
SCH-2030	ASTER Interface Filter	Planning & Scheduling
SCH-2040	ATC Load Generation	Planning & Scheduling
SCH-2050	Microprocessor Loads	Planning & Scheduling
SCH-2160	Relative Time Sequence Load Generation	Planning & Scheduling
SCH-2200	Table Load Validation & Generation	Planning & Scheduling
RCM-2000	Logical String Configuration & Control	RTS/String Initialization
RCM-2010	NCC GCMR Request Processing	RTS/String Initialization
CMD-2000	Command Authorization	RT/Ground Script Commanding
CMD-2005	Ground Script Control	RT/Ground Script Commanding
CMD-2010	Manual Command Processing	RT/Ground Script Commanding
CMD-2015	Ground Script Command Processing	RT/Ground Script Commanding
CMD-2017	Ground Script Manipulation	RT/Ground Script Commanding
TLM-2000	Decommuration - Health & Safety/Standby Telemetry	RT Telemetry Monitoring
TLM-2010	Decommuration - Housekeeping Telemetry	RT Telemetry Monitoring
TLM-2020	Engineering Unit Conversion	RT Telemetry Monitoring
TLM-2022	I&Q Channel Data Receipt	RT Telemetry Monitoring
TLM-2025	Multi-byte Parameter Processing	RT Telemetry Monitoring
TLM-2027	Limits Processing	RT Telemetry Monitoring
TLM-2030	Realtime Telemetry Data Dropout	RT Telemetry Monitoring
TLM-2040	Realtime Telemetry Graph Display	RT Telemetry Monitoring
TLM-2050	Realtime Telemetry Tables	RT Telemetry Monitoring
TLM-2080	Realtime Telemetry Archive	RT Telemetry Monitoring
ANA-2000	Telemetry History Request/Dataset Generation	Telemetry History

**Table 3.1-1. FOS Release A Test Suite (2 of 2)**

Test Title	Test Name	Associated Thread
ANA-2020	User Specified Statistics Request/Dataset Generation	Telemetry History
ANA-2070	Analysis Request Management	Telemetry History
CON-2000	Post-patch Confidence Test	Regression Test
HRD-2000	EOC Hardware	Hardware
INT-2000	End-to-End Test #1	N/A
INT-2010	End-to-End Test #2	N/A
INT-2020	End-to-End Test #3	N/A

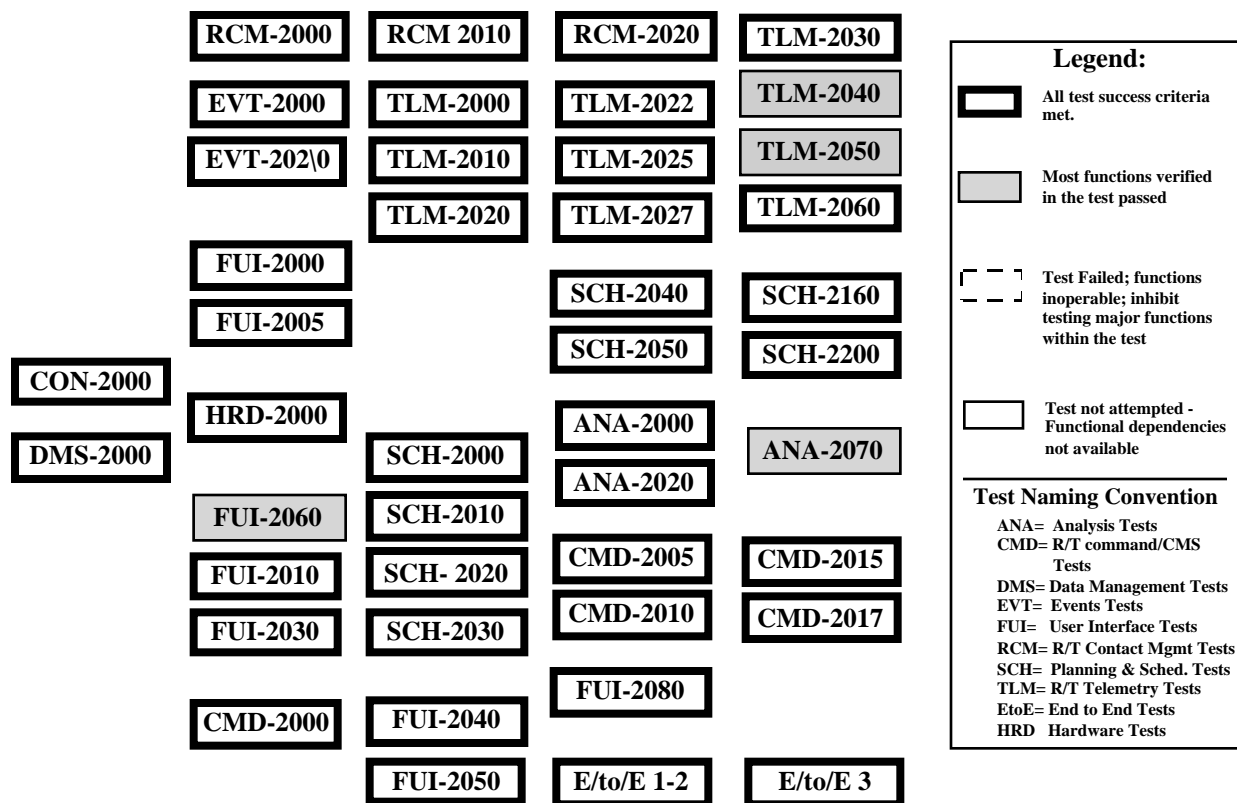
### **3.2 FOS Testing During the Formal Test Phase**

The FOS Release A Formal Acceptance Test Suite was conducted between November 11 and November 26, 1996 at the EOC at GSFC, Greenbelt, Md. The test suite was conducted by the joint effort of the FOS Test and System Management Office (SMO) Acceptance Test (ATO) organizations and was witnessed by cognizant NASA, Quality Assurance (QA) and Independent Verification & Validation (IV&V) personnel.

For each test conducted, a test log was completed, detailing the successes/failures of each test, deviations made to procedures, NCRs written or verified as fixed, and a complete description of the as-run tests. Following the conduct of each test, the FOS Test Team determined the status of assigned requirements (i.e. verified passed, passed-no data, verified partial pass, verified failed, or not tested) and indicated status for each associated Level 4, RBR and IRD requirement. This was performed for all tests in the FOS test suite (excluding Confidence Test 2000A, which has no assigned RBR or Level 4 requirements). The following sections provide the general and detailed results of this formal test period.

### **3.3 FOS Release A Formal Test Results**

During the FOS Release A formal test timeframe, the entire suite of 45 tests were completed (100%). Several tests were performed twice, once as part of the initial pass and again following the emergency software patch received on November 20, 1996. Tests performed twice include CON-2000A (Post-patch Confidence Test), TLM-2025A (Multi-byte parameter processing), CMD-2010A (Manual Commanding), CMD-2015A (Ground Script Control), and ANA-2070A (Analysis Request Management). Forty-one tests fully passed as success criteria identified was fully met; four tests were partially met with minor flaws in associated functionality (see Figure 3.3-1).



**Figure 3.3-1. FOS Formal Test - Release A**

### 3.3.1 FOS Subsystem - General Results

This section defines general FOS capabilities verified by the FOS and ATO organizations for each of the FOS subsystems via the execution of the FOS Release A Test Suite during the formal test phase (detailed information on requirement status for each test is available in Section 3.3.2)

#### User Interface Subsystem

All general functionality provided by the User Interface subsystem was available in Release A. Through the use of user interface supplied tools, the FOS users were able to generate commands via ground script and via Command PROC entry; view decommutated and engineering unit converted telemetry, view generated real-time events and request event history reports. The user was allowed to create individual rooms defined with selected alphanumeric displays and also allowed to build telemetry pages with user-specified ground and/or spacecraft telemetry mnemonics. Through the use of ECL directives, real-time strings were configured, commands were transmitted, PROCs were defined and alphanumeric pages were generated. The user interface subsystem also supported the display of real-time telemetry graphs and tables, updated by the telemetry subsystem.

The user interface subsystem also supported event display filtering functions, as well as supporting the display of I channel telemetry processing information via alphanumeric display capabilities (Q channel display is not currently available). Also verified was the ability to generate and execute real-time and command PROCs via tools provided by the User Interface Subsystem.

### Data Management Subsystem

Data Management Subsystem services provided successful support of telemetry, command and command management functions throughout the Release A Test Period. The DMS capabilities successfully verified include the ingest and validation of command and telemetry definition files following receipt from the spacecraft contractor. Scripts dedicated to the ingest and validation of command and telemetry definitions were successfully executed, followed by the comparison of the ingested tables to those of the spacecraft contractor. The validation of the ingested command and telemetry tables was successfully demonstrated, as both command and telemetry tables were successfully moved from the unvalidated to the validated database dedicated areas.

More importantly, following successful execution of database ingest and validation, the database tables ingested as part of the DMS test suite were successfully utilized during the testing of command via command and uplink load generation as well as telemetry processing via telemetry decommutation, limits checking and engineering unit conversion support.

### Planning & Scheduling Subsystem

Planning and Scheduling provided the capability to support the scheduling of activities and commands on the mission timeline, and the capability for the user to manipulate the timeline in regard to time and resources. FOS users were able to create spacecraft and instrument activities and schedule them across a specified timeline using the Activity Definer Tool. The creation of baseline activity profiles (BAPs) was also demonstrated using the BAP Definer Tool. Through the use of this tool, the user was able to specify valid activities and modifications to associated command parameters within the BAP construct. The created BAPs were then successfully incorporated into the schedule timeline. Following the successful generation of activities, FOS users were able to create and display specified Detailed Activity Schedules.

### Command Management Subsystem

For Release A, it was verified that CMS allows the user to define the contents for Absolute Time Command (ATC) loads, Microprocessor (MP) loads, Relative Time Sequence (RTS) Command loads, and Table Loads. Via DAS generation functions provided by the Planning & Scheduling Subsystem and supported by the User Interface Subsystem, the DAS was successfully sent to the CMS Schedule Controller process for expansion and ATC/RTS load generation. The binary load content and load report were also successfully demonstrated. Through the use of User Interface tools, FOS users successfully invoked requests for CMS to generate a ground schedule that corresponded to the start and stop time of the DAS used for ATC or RTS load generation processes.

The FOS was successful in ingesting microprocessor load content file, validation of the content and generation of the microprocessor uplink load. The load report and load image file content were both analyzed to ensure proper content.

Via use of User Interface provided tools, FOS users were able to successfully modify the contents of a table load and save the modified version of the load. Following successful generation of loads, it was successfully demonstrated that load content was validated against the specified load characteristics defined in the Project Database for the specified load. Finally, uplink load, image load, load report, load content file, and load catalog entry associated with specified loads were demonstrated as successful.

### Real-time Command Subsystem

For Release A, it was verified that all unauthorized requests for command authorization were rejected and authorized requests were granted. The FOS Test Team reviewed event history to confirm all reassignments of CAC privileges and successfully verified there is a single point of command for each string resource. Also verified were the capabilities to select a valid ground script, initiate execution of the ground script, manipulate ground script control and terminate the ground script via user directives. Software problems encountered during the prerequisite state check and submnemonic value check tests warranted a patch delivery during the Release A timeframe.

Following the patch, ground, critical, and prerequisite state check commands as well as commands with submnemonics were transmitted via ground script, PROC and manually. Commands were transmitted at specific rates, up to 10kbps. Via the use of the TCP-Dump tool, the FOS test team captured and monitored commands over specific port numbers; the team was able to confirm the proper command transfer frame construction (i.e. transfer frame header, application data fields) by comparing the captured data blocks with information provided via ICD-106.

### Telemetry Subsystem

All general functionality for telemetry was available in Release A. Through the use of the database, test data was inserted to aid in the verification of telemetry decommutation, engineering unit conversion, multi-byte parameter processing, and limits processing/display. Telemetry decommutation/EU conversion was able to support seventh order or lower polynomials, exponential conversions, and linear conversions. The user was able to define parameters to be varied in length up to 64 bits. Parameters could either be one piece or multiple pieces (up to eight); contiguous or non-contiguous. Limit conditions were also defined for each parameter, with the support of one set of limit conditions. The user was able, through the use a the telemetry driver, to send housekeeping, health & safety and standby packets across the FOS LAN. These packets were decommutated and EU converted according to their database definitions. Packets were analyzed through the use of TCP Dump tool to verify correct telemetry packet construction (i.e. CCSDS packet header, secondary packet header, application data field).

Telemetry was displayed through the use of dynamic pages. The user was able to create these pages in the form of a list of mnemonics with associated values. The telemetry subsystem allowed the labeling of parameters with static, nodata, active and quality flags when those

conditions occurred. Parameter value displays also changed color when certain limit conditions occurred to give the user a visual limit indication. Event messages were received for all limit violations and data dropouts and all telemetry were archived successfully.

Unfortunately during the Release A Formal Test period, no testing was performed with the EDOS concerning telemetry receipt capabilities via the Ebnet interface. Therefore, telemetry receipt via the EDOS EBnet link could not be confirmed.

### Analysis Subsystem

Basic functionality was provided by the analysis subsystem. The user was able to submit multiple analysis requests. The database was used to hold the requests in a queue, and it contained the name of the request, the status and the percentage complete. Two types of analysis requests were provided in Release A, basic analysis request & dataset generation and the user-specified statistics request. A telemetry driver developed by the Telemetry Subsystem personnel was supplied to read and convert datasets to carryout files and user-specified statistics reports. These reports were analyzed post-test to ensure data accuracy.

## 3.3.2 FOS Individual Test Results

This section defines the individual test status results each test in the FOS Release A Test Suite, including thread, end-to-end, hardware, and confidence tests.

### 3.3.2.1 Database Thread Test

This section presents the detailed result information for test DMS-2000A (Database Ingest, Validation & ODF Generation).

<b>Test Case #/Title:</b>	DBS-2000A Data Base Ingest, Validation & ODF Generation
<b>Reference to Test Documentation:</b>	FOS Release A Integration & Test Procedures (322-CD-010-003)
<b>Test Summary:</b>	This test is designed to verify the DMS capability to support the ingest and validation of command and telemetry definition files into the Project Database (PDB), upon receipt of the files from the spacecraft contractor. The test begins with the allocation of disk space plus the initialization of the database and associated tables. Once the database is initialized, scripts are invoked to ingest command and telemetry definitions files from a dedicated EOC directory location into the unvalidated project database table(s). The test conductor will compare the populated database tables with the definition files received from the spacecraft contractor to ensure the ingest of all files into the Sybase tables. A total

of fourteen (15) definition files will be moved into Sybase, (9) telemetry and (6) command files respectively.

Once the file ingest is complete, two scripts are invoked to perform the validation of the command and telemetry files that reside in the unvalidated database table. Upon completion of the validation scripts, the test conductor verifies that valid definition files are moved from the unvalidated to the validated database table, those definitions that failed the validation process are not moved to the validated database and an error messages describing the reason for validation failure is written to a log file.

**Pass/Fail Assessment:**

Pass

**Date of Test:**

18 November 1996; Building 32 - GSFC.

**Test Conduct Summary:**

Ingested the telemetry and command definition files provided by the spacecraft contractor. Once the database was populated, DMS scripts were run to invoke telemetry and command validation. At the conclusion of the validation process, the validated PDB database is populated with the definitions that passed validation error free. Any definitions that failed the validation process were written to a validation log and are not moved to the validated database.

**NCRs Written:**

None

### Requirement Verification Status:

Test Case	L4	Text	REQ Status	NCRs
DMS-2000A	F-DMS-00110	The EOC shall accept housekeeping and engineering telemetry definitions.	VP	
	F-DMS-00120	The telemetry definitions shall contain the following information: a. telemetry packet processing definitions b. discrete telemetry definitions c. discrete state definitions - up to 16 ranges for each discrete parameter d. analog telemetry definitions e. red/yellow, delta limit definitions - up to four limit sets for each parameter may be defined f. linear engineering unit conversion definitions - up to four linear sets specified with up to 15 point pairs for each analog parameter g. polynomial engineering unit conversion definitions - up to four polynomial sets with up to the 7th order equations for each analog parameter h. derived parameter definitions - up to five input parameters in an equation i. context dependent definitions - up to 16 ranges may be specified for each parameter j. subsystem/instrument definitions	VPT	ECSed04432*
	F-DMS-00130	The EOC shall accept spacecraft and instrument command definitions.	VP	
	F-DMS-00140	The command definitions shall contain the following information: a. spacecraft command definitions b. instrument command definitions c. command criticality d. telemetry verification e. prerequisite state checking f. command conversion instructions g. memory mapping definitions h. table definitions i. stored command indicator	VPT	ECSed04450*
	F-DMS-00310	The EOC shall provide the capability to perform validation on the telemetry definitions maintained in the PDB.	VP	
	F-DMS-00320	The EOC shall provide the capability to perform validation on the command definitions maintained in the PDB.	VP	
	F-DMS-00350	The EOC shall provide the capability to generate a validation report which contains summary and error information.	VP	
	F-DMS-00360	The EOC shall provide the capability to perform validation on modifications to the PDB definitions.	VP	
	F-DMS-00610	The EOC shall provide for operational use of the telemetry PDB definitions.	VP	



**Requirement Verification Status (cont.):**

Test Case	L4	Text	REQ Status	NCRs
	F-DMS-00620	The EOC shall provide for operational use of the command PDB definitions.	VP	
	F-DMS-01310	The EOC shall provide the capability to input ground telemetry definitions.	VP	
	F-DMS-01320	The EOC shall provide the capability to validate ground telemetry definitions.	VP	
	F-DMS-01330	The EOC shall provide for operational use of validated ground telemetry definitions.	VP	

\* = NCR written during dry-run test phase

**Test Procedure Deviations:**

Modified step 11c to reflect the telemetry files generated by performing telemetry validation.

Tlm\_Filter\_Keys Process is delivered with the system instead of being generated during the validation process.

**3.3.2.2 Event Thread Tests**

This section presents the detailed result information for event message processing thread tests EVT-2000A and EVT-2020A.

**Test Case #/Title:**

EVT-2000A Event Message Display and Event Graphic Timeline

**Reference to Test Documentation:**

FOS Release A Integration & Test Procedures 322-CD-010-003

**Test Objectives:**

This test is designed to verify the ability to display generated event messages at EOC user stations utilizing event message display options supplied by the FOS user interface. The test begins with the initialization of the EOC and display of the event graphic timeline. The event message generator is invoked, multicasting event messages for display. The graphical event timeline functionality is then verified, including event message formatting, timeline indicators, time correlated visual indicators, and event message selection/graphical timeline interaction.

**Pass/Fail Assessment:**

Pass

**Date of Test:**

12 November 96 at the EOC, Building 32, GSFC

**Test Conduct Summary:**

A majority of all requirements were verified through formal testing on 11/12/96. The test was completed without any major problems. The FOS/EOC software demonstrated the capability to generate and display event messages from all FOS subsystems and to filter those event messages according to requirements. Several NCR's were opened during the testing period, below is the list; none critical.

**NCRs Written:**

ECSed04728

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
EVT-2000A	F-DMS-00910	The EOC shall archive all event messages.	VP	
	F-DMS-01210	The FOS shall provide the capability to generate event messages.	VP	
	F-DMS-01220	The FOS event messages shall include the following: a. UTC time tag b. Event type c. Event Identifier d. Event message e. Spacecraft Identifier (if applicable) f. Instrument Identifier (if applicable)	VP	
	F-DMS-01230	The FOS shall provide the capability to filter event messages by: a. UTC time tag b. Event type c. Event Identifier d. Spacecraft Identifier (if applicable) e. Instrument Identifier (if applicable)	VP	
	F-DMS-01250	The FOS shall provide the capability to designate a type of event message as an alarm.	VP	
	F-DMS-01260	The FOS shall provide the capability to designate a type of event message as not an alarm.	VP	
	F-DMS-01270	The FOS shall provide the capability to generate events upon receipt of hardware component status change information from the MSS.	UV	ECSed04728
	F-DMS-01280	The FOS shall provide the capability to generate events upon receipt of permanent and temporary software component status change information from the MSS.	UV	ECSed04728

**Requirement Verification Status (cont.):**

Test Case	L4	Text	REQ Status	NCRs
	F-FOS-00240	The EOC shall provide time resolution of 10 milliseconds for the internal EOC computer clocks.	VP	
	F-FOS-00250	The FOS shall provide that the time lag between the production of an event message and its display does not exceed 1.0 second.	VP	
	F-FOS-00255	The FOS shall provide a time accuracy for time tagging of event messages within 1 second of their occurrence.	VP	
	F-FUI-03210	The FOS shall allow the user to specify one or more spacecraft subsystems as a filter criteria.	VP	
	F-FUI-09600	The FOS shall display informational text messages about events that occur at EOC, ISTs, S/C and instruments.	VP	
	F-FUI-09605	The FOS shall provide a filter capability for the real-time event and event history displays that allows events to be included, excluded, or highlighted according to: a. spacecraft Id b. ground system c. instrument d. spacecraft subsystem e. event message type f. time period	VPT	ECSed04376 *
	F-FUI-09610	The event display shall have a scrolling text field that displays the current event messages.	VP	
	F-FUI-09615	The event display shall contain a graphical timeline that displays one indicator per event.	VP	
	F-FUI-09620	The graphical timeline event indicators shall be color coded per event type.	VP	
	F-FUI-09625	As a user scrolls through the event text, the graphical timeline shall display a time correlated visual indicator.	VP	
	F-FUI-09630	As a user selects an event in the graphical timeline, the event text shall scroll to the corresponding event.	VP	
	F-FUI-09635	The FOS shall allow the user to search for event messages that contain specific textual content.	VP	

\* = NCR written during dry-run test phase

**Test Procedures Deviations:** None

**Test Case #/Title:** EVT-2020A Event History Request

**Reference to Test Documentation:** FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Objectives:** This test is designed to verify the ability to retrieve all event messages from the event archive via a NETSCAPE access/viewing tool by specifying start/stop time, event type, event identifier, spacecraft identifier, and instrument identifier. This test was also designed to verify the ability to filter retrieved events according to time, event types, event identifiers, spacecraft identifiers, and instrument identifiers.

**Pass/Fail Assessment:** Pass

**Date of Test:** 13 November 1996 at the EOC, Building 32, GSFC

**Test Conduct Summary:** All requirements were verified through formal testing on 11/13/96. The test was conducted without any major problems. The FOS software demonstrated that it could retrieve archived event history data by UTC start time, UTC stop time, Event Type, Event Identifier, Spacecraft Identifier, Instrument Identifier. Successfully retrieved Event Messages in chronological order, and provided the capability to store the results of the history request for future analysis.

**NCRs Written:** ECSed04667

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
EVT-2020A	F-DMS-00930	The FOS shall provide the capability to retrieve archived events by specifying the following: a. UTC start time b. UTC stop time c. Event type(s) d. Event identifier e. Spacecraft Identifier (if applicable) f. Instrument Identifier (if applicable)	VP	
	F-DMS-00940	The EOC shall retrieve event messages in chronological order.	VP	
	F-FUI-09710	The FOS shall provide the user with the capability to store the results of the event history request for future analysis.	VP	

**Test Procedure Deviations:** None

### **3.3.2.3 General User Interface Thread Test**

The following represents the detailed result information for test FUI-2000A (Control Window Manipulation).

**Test Case #/Title:** FUI-2000A Control Window Manipulation

**Reference to Test Documentation:** FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:** This test is designed to verify capabilities related to the control and management of the user station desktop environment. This test identifies the available functions of the control window. A list of user defined rooms are displayed and selected for manipulation. The rooms are modified by changing the size, location, and focus of the existing windows. In addition to window manipulation, the event driver is invoked to broadcast event messages onto the FOS LAN. Filtering capabilities are tested by specific event types (i.e. telemetry, command, etc.) through the Event Display window.

**Pass/Fail Assessment:** Pass

**Date of Test:** 12 November 1996; EOC, GSFC Building 32

**Test Conduct Summary:** This test successfully verified the FOS capability for the user to access, through the control window, a list of available rooms, windows, procedures, and tools. The Control window contained a command line area that allowed the user to issue directives. The 20 most recent command line inputs were available for display and editing. Windows in the room were modified by use of the mouse. The three-line event area displayed the most recent three event messages only, in UTC order. Three-line event filtering matched the filter options selected by the user except for the TLM option. RMS messages appeared with the TLM filtering option. The Event Display window would not function while the Netscape Navigator was operational. It was also noted that the work station display clock was inconsistent with the event message times.

**NCRs Written:**

ECSed04772

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
FUI-2000A	F-FUI-01305	The FOS shall contain a command line area that allows the user to issue directives from a workstation keyboard.	VP	
	F-FUI-01310	The FOS shall provide a command line editing capability that allows the retrieval and display of the 20 most recent input lines for modification and resubmission.	VP	
	F-FUI-01315	The FOS shall allow the user access to the following capabilities: a. user specified rooms b. a list of available rooms c. a list of available windows d. additional tools (i.e., environment setup) e. procedures	VPT	ECSed04772*
	F-FUI-01320	The FOS shall provide an area that displays the three most recent event messages sent to the user.	VP	
	F-FUI-01325	The FOS shall enable the user to filter event messages according to the type of event.	VP	
	F-FUI-01330	The FOS shall allow the user to initiate functions from a control window using a pointing device.	VP	
	F-FUI-01335	The FOS shall allow the user to perform typical windowing desktop control with the pointing device, including: a. window focus selection b. window movement c. window resizing d. window closing e. window iconifying	VPT	ECSed04361*

\* = NCR written during the dry-run test phase

**Test Procedure Deviations:**

During ECL Directive testing, the key board locked and the work station was rebooted.

The Netscape Navigator was terminated during the test due to the problems it caused with the execution of the Event Display window.

**3.3.2.4 User Interface Directive Input Thread Tests**

This section presents the detailed result information for tests FUI-2005A ( ECL Directives), FUI-2010A (PROC Builder), and FUI-2030A (Request Preplanned Command PROC).

**Test Case #/Title:**

FUI-2005A ECL Directives

**Reference to Test Documentation:** FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:** This test is designed to verify the ability to input and syntax FOS

Release A ECL directives from the command line at EOC user stations. Response message output and specific actions taken as a result of directive input will be verified by viewing response line and event display areas of the display screens. In cases where the FOS system functionality is not mature enough to completely execute a particular ECL directive, testing is performed to confirm that the ECL directive has been defined, can be entered at the ECL command line and syntax checked.

**Pass/Fail Assessment:** Pass

**Date of Test:** 12 November 1996; EOC, Building 32, GSFC

**Test Conduct Summary:** This test successfully verified all ECL directives entered for syntax and that a syntax error was displayed for all ECL directives that are entered incorrectly. Incorrectly entered directives were not executed. All ECL directives entered are verified for the appropriate user privileges prior to execution. ECL directives that were entered without the appropriate user privileges were not executed and resulted in an error message. Not All ECL directive entries, regardless of syntax or privileges were displayed in the event history window. For ECL directives that were considered completely executable in release A, not all executed properly or provided a response that was displayed at the user workstation event history window. Alphabet case sensitivity was inconsistent for directives.

**NCRs Written:** ECSed04661 ECSed04662

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
FUI-2005A	F-FUI-01500	The FOS shall perform a syntax check of all directives entered by the user.	VP	
	F-FUI-01505	The FOS shall notify the user of directive syntax errors.	VP	
	F-FUI-01595	The FOS shall initiate a directive within .5 seconds.	VP	

<b>Test Procedure Deviations:</b>	No deviations from the test procedure.
<b>Test Case #/Title:</b>	FUI-2010A Procedure Builder
<b>Reference to Test Documentation:</b>	FOS Release A Integration & Test Procedures (322-CD-010-003)
<b>Test Summary:</b>	<p>This test is designed to verify the ability to create, edit, store, print, delete, and syntax check ECL-based PROCs. The test will verify the validate status display also. The test begins with the initialization of the EOC to support PROC processing. When the PROC Builder tool is invoked, several PROCs are generated according to a specified PROC type (e.g., emergency, command, ground, local, activity, and user-defined). The PROCs are saved by a specified spacecraft, instrument, or spacecraft-instrument name. The next set of steps involves the editing of several previously defined PROCs. Standard editing options will include cut, copy, paste text, delete text, insert text, search/replace, and insert an existing PROC. The Directive Builder tool will also function as an editing mechanism. This procedure will include the verification of various constructs and operator functions within a PROC.</p>
<b>Pass/Fail Assessment:</b>	Pass
<b>Date of Test:</b>	14 November 1996; EOC, Building 32, GSFC
<b>Test Conduct Summary:</b>	<p>This test successfully measured the ability to open and create new PROCs through the use of the Procedure Builder and Directive Builder. FOS included the functionality to insert directives, conditional constructs, iterative loops, and operator functions into a procedure. The ability to store PROCs by type, spacecraft, and/or instrument; to execute syntax checking; and to print procedures was available. This test failed at verifying various arithmetic and logical operators. These failures affected the validation of the constructs and logical expressions.</p>
<b>NCRs Written:</b>	ECSeD04721      ECSeD04771



### Requirement Verification Status:

Test Case	L4	Text	REQ Status	NCRs
FUI-2010A	F-FUI-01510	The FOS shall allow a user to specify values within a directive in any of the following formats: a. decimal b. hexadecimal c. octal d. binary e. string f. floating point g. scientific notation h. time i. angles	VP	
	F-FUI-01515	The FOS shall allow a user to specify a conditional construct within a procedure.	VP	
	F-FUI-01520	The FOS shall allow the nesting of conditional constructs.	VP	
	F-FUI-01525	The FOS shall allow a user to specify iterative loop constructs within a procedure. The loop constructs shall include: a. while loop (test condition prior to entering loop) b. until loop (test condition at the end of the loop) c. for loop (includes an initialization expression, a conditional expression used to terminate the loop, and a loop expression that is executed at the end of each loop iteration)	VP	
	F-FUI-01530	The FOS shall allow the nesting of loop constructs.	VP	
	F-FUI-01535	The FOS shall be capable of prematurely terminating conditional loop execution (i.e., procedure execution jumps to the first directive following the end of the loop).	VP	
	F-FUI-01538	The FOS shall allow a procedure to reference telemetry parameters.	VP	
	F-FUI-01540	The FOS shall allow a user to specify temporary variables within a procedure.	VP	
	F-FUI-01545	The FOS shall allow a user to specify temporary variable arrays within a procedure.	VP	
	F-FUI-01550	The FOS shall allow a user to specify comments within a procedure.	VP	
	F-FUI-01555	The FOS shall allow a user to define labels within a procedure.	VP	
	F-FUI-01560	The FOS shall allow a user to specify a jump to a labeled statement within a procedure.	VP	

**Requirement Verification Status (cont.):**

Test Case	L4	Text	REQ Status	NCRs
	F-FUI-01570	The FOS shall allow a procedure to accept arguments when invoked.	VP	
	F-FUI-01585	<p>The FOS shall provide arithmetic and logical operators for use within procedures. These operators are identified in the following table. Operator precedence is listed from highest to lowest.</p> <p>Directive Operators</p> <p>Operator Function Arity Precedence</p> <p>++ Increment variable unary 1</p> <p>-- Decrement variable</p> <p>! Logical NOT</p> <p>~ Bitwise complement unary 2</p> <p>- Arithmetic negation</p> <p>+ Unary plus</p> <p>* Multiplication</p> <p>/ Division binary 3</p> <p>% Modulus</p> <p>+ Arithmetic addition binary 4</p> <p>- Arithmetic subtraction</p> <p>&lt;&lt; Left shift binary 5</p> <p>&gt;&gt; Right shift</p> <p>&lt; Less than</p> <p>&lt;= Less than or equal to</p> <p>&gt; Greater than binary 6</p> <p>&gt;= Greater than or equal to</p> <p>== Equality</p> <p>!= Inequality</p> <p>&amp; Bitwise AND binary 7</p> <p>^ Bitwise exclusive OR binary 8</p> <p>  Bitwise inclusive OR binary 9</p> <p>&amp;&amp; Logical AND binary 10</p> <p>   Logical OR binary 11</p> <p>// Concatenation binary 12</p>	VPT	ECSed04771
	F-FUI-01590	The FOS shall allow the use of parentheses to group arithmetic and logical operations within a directive.	VP	

**Requirement Verification Status (cont.):**

Test Case	L4	Text	REQ Status	NCRs																																
	F-FUI-01591	<p>The FOS shall provide built-in functions for use within a directive. These functions are defined in the following table.</p> <p style="text-align: center;">ECL BUILT-IN FUNCTIONS</p> <table><thead><tr><th>Function Name</th><th>Description</th></tr></thead><tbody><tr><td>acos function</td><td>trigonometric arc cosine</td></tr><tr><td>asin function</td><td>trigonometric arc sine</td></tr><tr><td>atan function</td><td>trigonometric arc tangent</td></tr><tr><td>cos function</td><td>trigonometric consine</td></tr><tr><td>sin function</td><td>trigonometric sine</td></tr><tr><td>tan function</td><td>trigonometric tangent</td></tr><tr><td>cosh function</td><td>hyperbolic consine</td></tr><tr><td>sinh function</td><td>hyperbolic sine function</td></tr><tr><td>tanh function</td><td>hyperbolic tangent</td></tr><tr><td>exp function</td><td>exponential function</td></tr><tr><td>log function</td><td>natural logarithm</td></tr><tr><td>log10 function</td><td>base-10 logarithm</td></tr><tr><td>pow function</td><td>power function</td></tr><tr><td>sqrt function</td><td>nonnegative square root</td></tr><tr><td>fabs</td><td>returns the absolute value</td></tr></tbody></table>	Function Name	Description	acos function	trigonometric arc cosine	asin function	trigonometric arc sine	atan function	trigonometric arc tangent	cos function	trigonometric consine	sin function	trigonometric sine	tan function	trigonometric tangent	cosh function	hyperbolic consine	sinh function	hyperbolic sine function	tanh function	hyperbolic tangent	exp function	exponential function	log function	natural logarithm	log10 function	base-10 logarithm	pow function	power function	sqrt function	nonnegative square root	fabs	returns the absolute value	VP	
Function Name	Description																																			
acos function	trigonometric arc cosine																																			
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sinh function	hyperbolic sine function																																			
tanh function	hyperbolic tangent																																			
exp function	exponential function																																			
log function	natural logarithm																																			
log10 function	base-10 logarithm																																			
pow function	power function																																			
sqrt function	nonnegative square root																																			
fabs	returns the absolute value																																			
	F-FUI-02800	The FOS shall provide a user the capability to create procedures.	VP																																	
	F-FUI-02805	The FOS shall provide an authorized user the capability to edit existing procedures.	VP																																	
	F-FUI-02810	The FOS shall provide a user the capability to save procedures according to one of the following procedure types: a. emergency b. command c. ground d. local e. activity f. user-defined categories	VP																																	

**Requirement Verification Status (cont.):**

Test Case	L4	Text	REQ Status	NCRs
	F-FUI-02815	The FOS shall provide a user the capability to save a procedure according to its spacecraft identifier.	VP	
	F-FUI-02820	The FOS shall provide a user the capability to save a procedure according to its instrument identifier.	VP	
	F-FUI-02825	The FOS shall provide a user the capability to identify the author of each procedure.	VP	
	F-FUI-02840	The FOS shall provide a user the capability to print existing procedures.	VP	
	F-FUI-02845	The FOS shall provide a user the following procedure editing capabilities: a. cut/copy/paste text b. delete text c. insert text d. search for text strings e. replace text strings f. insert an existing procedure	VP	
	F-FUI-02850	The FOS shall be capable of checking the syntax of a procedure.	VP	
	F-FUI-02855	The FOS shall display the current procedure syntax check status.	VP	
	F-FUI-02865	The FOS shall display the current procedure validation status.	VP	
	F-FUI-02870	The FOS shall display a list of directive keywords that the user may select from to build procedure directives.	VP	
	F-FUI-02875	The FOS shall display a list of directive keyword qualifiers that the user may select from to build procedure directives. The qualifier list will correspond to the selected keyword.	VP	
	F-FUI-02880	The FOS shall display a list of mnemonics descriptors that the user may select from to build procedure directives.	VP	
	F-FUI-02885	The FOS shall display a list of mnemonic qualifiers that the user may select from to build procedure directives.	VP	
	F-FUI-02890	The FOS shall display a set of current limit values that the user may select from to build procedure directives.	VP	

**Requirement Verification Status (cont.):**

Test Case	L4	Text	REQ Status	NCRs
	F-FUI-02895	The FOS shall provide a user the capability to insert the following items into the procedure text: a. directive keywords b. directive keyword qualifiers c. mnemonics d. mnemonic qualifiers (for mnemonics with discrete values) e. limit identifiers (for mnemonics with analog values)	VP	

**Test Procedure Deviations:** Due to failure in various constructs and logical expressions, the test was deviated to verify remaining constructs and logical expressions.

**Test Case #/Title:** FUI-2030A Request Pre-Planned Command PROC

**Reference to Test Documentation:** FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:** This test is designed to verify the ability to execute and monitor a PROC with commands. These commands may be critical or non-critical. The test will also verify the manual and PROC transmission of critical commands. The test begins with the initialization of the EOC to support PROC processing. The Command Control Window is invoked and PROCs are accessed. Once accessed, each PROC is executed and verified for transmission of critical and non-critical commands.

**Pass/Fail Assessment:** Pass

**Date of Test:** 11 November 1996; GSFC, Building 32

**Test Conduct Summary:** This test successfully provided the user with the ability to monitor the execution of command PROCs consisting of one or more commands. Prior to uplinking critical commands the system prompted the authorized user to submit an ALLOW or CANCEL. The command PROCs executed successfully as indicated on the Event Display. Within the Command Control Window the display of execution was impeded.

**NCR List:** ECSed04725      ECSed04761      ECSed04762

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
FUI-2030A	F-CMD-01315	The EOC shall be capable of transmitting commands from a command procedure consisting of one or more commands.	VP	
	F-CMD-03215	The EOC shall require a user authorization (allow or cancel) prior to uplinking a critical command, regardless of its origin (operator input, command procedure, or ground script).	VP	
	F-FUI-06100	The FOS shall allow an authorized user to invoke a procedure at a specified time.	F	ECSe04725
	F-FUI-06105	The FOS shall allow a user to terminate an executing procedure.	VP	
	F-FUI-06110	The FOS shall allow a user to suspend an executing procedure.	VP	

**Test Procedure Deviations:** There were no deviations to the test procedure.

**3.3.2.5 User Interface Tools Thread Tests**

This section presents the detailed result information for tests FUI-2040A (Time Selector), FUI-2050A (HELP Tool), FUI-2060A (Real-time Alphanumeric Page Display, and FUI-2080A (Screen Management).

**Test Case #/Title:** FUI-2040A Time Selector

**Reference to Test Documentation:** FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:** This test is designed to verify the ability to select time durations and interval options for historical analysis and replay functions via the Time Selector utility. Following sign-on at the EOC, the Time Selector utility is invoked via a test driver. A time selector window is invoked and time durations are supplied. After verification that a valid time was entered by the user, the time selector window is again invoked and new time durations entered and verified. The last portion of the test deals with the selection of menu options causing error conditions (i.e. missing fields in the selection).

**Pass/Fail Assessment:** Pass

**Date of Test :** 14 November 1996; EOC, Building 32, GSFC

**Test Conduct Summary :** The user was able to select an epoch time, a start/stop time/event or duration, and an interval time. Valid start/stop times/events or durations were based on calendar date and time, north/south equator crossing, orbital day/orbital night, loss of signal/acquisition of

signal, last N hours, and last N orbits. Interval times were based on every N orbits, passes, hours, days, weeks, and months. All valid time durations and interval times, entered by the user, were accepted by the Time Selector utility. All incorrectly specified durations or time intervals resulted in error messages.

**NCRs Written:** ECSed04725

**Requirement Verification Status :**

Test Case	L4	Text	REQ Status	NCRs
FUI-2040A	F-FUI-03100	The FOS shall allow the user to choose the start and stop time or an event and duration based on the following: a. calendar date and time b. north equator crossing c. south equator crossing d. entering orbital day e. entering orbital night f. loss of signal g. acquisition of signal h. last N hours i. last N orbits	VP	
	F-FUI-03105	The FOS shall allow the user to select an epoch.	VP	
	F-FUI-03110	The FOS shall allow the user to specify a time interval based on any of the following: a. every N passes b. every N orbits c. every N hours d. every N days e. every N weeks f. every N months	VP	

**Test Procedure Deviations :**

Several steps failed because of the fact that orbital events are not provided until Release B. Orbital Events could not be inserted into the database.

Step 12 was updated to enter a time without the milliseconds attached.

Skipped step 60g. This step was not needed.

**Test Case #/Title:**

FUI-2050A Help Tool

**Reference to Test Documentation:**

FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:**

This test is designed to verify the ability to access the HELP utility at the EOC. All FOS activities are initiated

(i.e., Display Builder, Analysis Request, etc.). As activities are initiated, the HELP utility is selected to display a HELP window in Netscape. HELP windows functionality is tested within the Netscape Navigator.

**Pass/Fail Assessment:** Pass

**Date of Test:** 12 November 1996; EOC, Building 32, GSFC

**Test Conduct Summary:** This test unsuccessfully accessed HELP utilities from any user station window. All HELP navigational schemes (i.e. hypertext forward, hypertext trace back, page forward, page backward, jump to home page, and search/find keyword) were available when the sample help screen within the Netscape Navigator was available..

**NCR List:**

ECSed04648	ECSed04659	ECSed04660
ECSed04654	ECSed04655	ECSed04656
ECSed04657	ECSed04658	ECSed04647

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
FUI-2050A	F-FUI-02705	The FOS shall provide the user with the capability to cancel any help data retrieval.	VP	
	F-FUI-02710	The FOS shall provide the user with the capability to open one or more help windows.	VP	
	F-FUI-02715	The FOS shall provide the user with the capability to request help information from any FOS window.	VPT	ECSed04647 ECSed04655
	F-FUI-02720	The FOS shall provide the user a help screen that displays help information pertinent to the display or activity the user is involved in when the user requests help.	F	ECSed04655 ECSed04647
	F-FUI-02725	The FOS shall provide a help screen with the following navigational schemes: a. hypertext forward b. hypertext trace back c. page forward d. page backward e. jump to home page (table of contents) f. search/find on a keyword	VPT	ECSed04657

**Test Procedure Deviations:** The only deviations that occurred resulted from unavailable help screens.

**Test Case #/Title:** FUI-2060A Real-Time Alphanumeric Display Builder

**Reference to Test Documentation:** FOS Release A Integration & Test Procedures (322-CD-010-003)



**Test Summary:**

This test is designed to verify the ability to build and manage displays in the user station desktop environment. The test begins with the invocation of the Display Builder Palette followed by a combination of "drag and drop" page building functions, including the generation of page background information (i.e. labels, horizontal/vertical separators), and the verification of accurate display of alphanumeric page foreground information (i.e. telemetry parameters, units, flags). Steps are provided to establish the data source for selected displays. After display pages and connecting data sources are established, the pages are saved, re-invoked from the DMS archive for redisplay, and used during telemetry processing.

**Pass/Fail Assessment:**

Partial Pass

**Date of Test:**

13 November 1996; EOC, Building 32, GSFC

**Test Conduct Summary:**

Dynamic display page background palette selections were generated per user request. All drag and drop display generation activities match those input via FUI Display Builder palette selections. Non-local displays generated were accessed by the EOC user. The data format was limited to the decimal state. All other conversions were unavailable for display.

**NCRs Written:**

ECSed04770

ECSed04720

ECSed04664

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
FUI-2060A	F-FUI-02625	The FOS shall allow the user to associate a telemetry value place holder and a descriptor/mnemonic place holder with a telemetry value.	VP	
	F-FUI-02630	The FOS shall allow the user to save a real-time display definition as: a. a local copy, and/or b. a submission to the FOS CCB as permanent, global copy.	VP	
	F-FUI-02640	The FOS shall allow the user to delete a real-time display definition.	VP	
	F-FUI-07135	The FOS shall label dynamically created displays as temporary.	UNV	ECSed04770
	F-FUI-07140	The FOS shall provide the capability to specify the real-time display data source(s).	VP	

**Requirement Verification Status (cont.):**

Test Case	L4	Text	REQ Status	NCRs
	F-FUI-07205	The FOS shall allow alphanumeric displays to display one or more telemetry parameters.	VP	
	F-FUI-07210	The FOS shall load alphanumeric displays dynamically from a predefined format.	VP	
	F-FUI-07225	The FOS shall be capable of displaying a telemetry value in the following formats: a. converted b. decoded c. raw	VPT	ECSe04435*
	F-FUI-07230	The FOS shall be capable of displaying a telemetry value in one of the following representations: a. formatted b. octal c. hex d. binary	VPT	ECSe04435*
	F-FUI-07235	The FOS shall allow the user to select telemetry parameters by using a pointing device (e.g., mouse, trackball, etc.).	VP	
	F-FUI-07240	The FOS shall allow the user to deselect telemetry parameters by using a pointing device (e.g., mouse, trackball, etc.) .	VP	
	F-FUI-12610	The FOS shall include a master/major cycle count in the Display Builder palette.	F	ECSe04760*
	F-FUI-17200	The FOS shall be capable of displaying master/major cycle count.	VP	
	F-FUI-17700	The FOS shall display current master/major cycle count.	VP	

\* = NCR written during dry-run test phase

**Test Procedure Deviations:** There were no deviations from this test procedure.

**Test Case #/Title:** FUI 2080A Screen Management

**Reference to Test Documentation:** FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:** This test is designed to verify the ability to manage the EOC user station desktop environment via the use of rooms and windows. The test begins with the initialization of the EOC. All default rooms are invoked and it is verified that these rooms match the user's default room assignment. A room is created by use of the Room Builder tool. Windows are added and deleted dynamically, repositioned within the displayed room, and re-sized to overlap one another. The room created is

saved and the defined room is then re-entered by the same user to ensure that the previously saved room definitions are available

**Pass/Fail Assessment:**

Pass

**Date of Test:**

12 November 1996; EOC, Building 32, GSFC

**Test Conduct Summary:**

User defined a room, the room displayed matched the individual user's default room assignment; window selection, size, and position. Position was dynamically switched via keyboard/mouse selection. Upon re-entering the windows in the defined room maintained their position and size keeping the same appearance as it did when user left the room. All of the functionality was verified, however there were a few usability issues.

**NCRs Written:**

None

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
FUI-2080A	F-FUI-01100	The FOS shall provide access to all room definitions in the system.	VP	
	F-FUI-01105	The FOS shall provide the capability to define a room.	VP	
	F-FUI-01110	The FOS shall provide the capability to modify a room.	VP	
	F-FUI-01115	The FOS shall provide the capability to save a room.	VP	
	F-FUI-01130	The FOS shall allow a window to belong to more than one room.	VP	
	F-FUI-01135	The FOS shall allow windows to overlap each other.	VP	
	F-FUI-01140	The FOS shall allow a window to have a name.	VP	
	F-FUI-01145	The FOS shall provide the capability to define the default position and size of each of the windows in a room.	VP	
	F-FUI-01155	The FOS shall provide the capability to add windows to a room dynamically.	VP	
	F-FUI-01160	The FOS shall provide the capability to delete windows from a room dynamically.	VP	
	F-FUI-01165	The FOS shall provide the capability to switch from one room to another dynamically.	VP	

**Test Procedure Deviations:** Test completed successfully without deviations.

### 3.3.2.6 Scheduling Thread Tests

This section presents the detailed result information for tests SCH-2000A (Activity Definer Tool), SCH-2010A (BAP Definer Tool), SCH-2020A (General Scheduler & Timeline), SCH-2030A (ASTER Interface Filter), SCH-2040A (ATC Load Generation), SCH-2050A (Microprocessor Loads), SCH-2160A (RTS Load Generation) and SCH-2200 (Table Load Validation & Generation).

<b>Test Case #/Title:</b>	SCH-2000A Activity Definer
<b>Reference to Test Documentation:</b>	FOS Release A Integration & Test Procedure (322-CD-010-003)
<b>Test Summary:</b>	<p>This test verifies the Planning &amp; Scheduling (PAS) subsystem's capability to support the generation of activity definitions via the Activity Definer Tool. Performing this test demonstrates that the Activity Definer Tool allows a user to create a new activity for a given spacecraft subsystem or instrument. For the newly created activity, the user is able to specify: commands to be incorporated, relative times for the commands, modifications to associated command parameters and mode transitions that occur during activity execution. In addition, the user is able to incorporate complex activities, ECL directives and command procedures into the activity defined. Once the activity has been created, this test demonstrates that the user is able to save the activity, open the activity and make modifications, save the activity under a different name using the 'save as' option and delete the activity from the pool of available activities. A version of the activity is saved in the activity pool for later incorporation into a BAP and/or mission schedule during BAP and mission scheduling tests to be performed.</p>
<b>Pass/Fail Assessment:</b>	Pass
<b>Date of Test:</b>	13 November 1996; EOC - GSFC Building 32
<b>Test Conduct Summary:</b>	<p>Through the use of the Activity Definer Tool, a user was able to create an activity for a given spacecraft subsystem or instrument. The user was able to include in the activity, an associated command sequence with relative times, command parameters, modes transitions, ECL directives and command procedures. Once the activity has been defined, the user was able to 'Save' the activity, use the 'Open' option to recall it, make modifications,</p>

rename it using the 'Save As' option and delete the activity from the pool of available activities. No NCRs were written from the formal testing.

**NCRs Written:**

None

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
SCH-2000A	F-DMS-00150	The EOC shall accept spacecraft and instrument activity definitions.	VP	
	F-DMS-00160	The activity definitions shall contain the following information: a. command listing b. parameter mapping definition c. parameter limit definitions	VP	
	F-PAS-00200	The FOS shall provide the capability for an authorized user to create an activity definition.	VP	
	F-PAS-00205	The FOS shall provide the capability for an authorized user to modify an activity definition.	VP	
	F-PAS-00210	The FOS shall provide the capability for an authorized user to delete an activity definition.	VP	
	F-PAS-00215	The FOS shall provide the capability to associate a command sequence with an activity definition.	VP	
	F-PAS-00220	The FOS shall provide the capability to define parameters in an activity definition and associate them with individual commands in an activity command sequence.	VP	
	F-PAS-00300	The FOS shall provide the capability for an authorized user to schedule an activity for a specific date and time	VP	
	F-PAS-00310	The FOS shall provide the capability for an authorized user to schedule an activity at user defined intervals starting at a specific date and time.	VP	
	F-PAS-00315	The FOS shall provide the capability for an authorized user to schedule an activity at a delta time from some mission event.	VP	
	F-PAS-00330	The FOS shall assign a unique identifier to each individual activity in the mission schedule.	VP	
	F-PAS-00350	The FOS shall provide the capability for an authorized user to schedule a list of activities.	VP	
	F-PAS-00400	The FOS shall provide the capability for an authorized user to supply optional parameters before an activity is scheduled .	VP	
	F-PAS-00405	The FOS shall supply predefined default parameter values if optional parameters are not supplied before an activity is scheduled .	VP	
	F-PAS-00415	The FOS shall not allow an optional parameter to be defined out of predefined limits for an activity that is scheduled .	VP	

<b>Test Procedure Deviations:</b>	No deviations from the test procedure.
<b>Test Case #/Title:</b>	SCH-2010A BAP Definer
<b>Reference to Test Documentation:</b>	FOS Release A Integration & Test Procedures (322-CD-010-003)
<b>Test Summary:</b>	<p>This test verifies the FOS Planning &amp; Scheduling (PAS) subsystem capability to support the generation of Baseline Activity Profile (BAP) definitions via the use of the BAP Definer Tool. Performing this test demonstrates that the BAP Definer Tool allows a user to create a new BAP definition for a given spacecraft subsystem or instrument. Creating a BAP allows the user to schedule a repetitive sequence of activities that define the normal operations for the instrument or subsystem. For a created BAP the user is able to specify: valid activities for incorporation, modifications to associated command parameters, and modify off-set times associated with the activities. Through the file menu, the user is able to 'save' the BAP, select 'save as' to rename the BAP, 'close' the BAP, select 'open' to recall the BAP for modifications and 'delete' the BAP from the resource model pool.</p>
<b>Pass/Fail Assessment:</b>	Pass
<b>Date of Test:</b>	13 November 1996; EOC, Building 32, GSFC
<b>Test Conduct Summary:</b>	<p>Through the use of the BAP Definer Tool, an authorized user was able to create, save, modify and delete a BAP for a selected spacecraft subsystem or instrument. The user was able to include in the BAP a defined activity sequence with off-set times and associated command parameters. Once the BAP definition has been created, the user was able to 'Save' the BAP, use the 'Open' option to recall the BAP, make modifications, rename the BAP using the 'Save As' option and 'Delete' to delete the BAP from the resource model pool. One NCR was written during this test period; ecsed04642.</p>
<b>NCR List:</b>	ECSed04642

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
SCH-2010A	F-PAS-00500	The FOS shall provide the capability for an authorized user to create a list of recurring activities and store them in a Baseline Activity Profile (BAP) definition for an instrument, spacecraft subsystem, or ground system.	VP	
	F-PAS-00503	The FOS shall provide the capability for an authorized user to maintain a Baseline Activity Profile (BAP) definition.	VP	
	F-PAS-00505	The FOS shall provide the capability for an authorized user to delete a Baseline Activity Profile (BAP) definition.	VP	

**Test Procedure Deviations:**

No deviation from the test procedure.

**Test Case #/Title:**

SCH-2020A General Scheduler & Timeline

**Reference to Test Documentation:**

FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:**

This test is designed to verify the Planning & Scheduling (PAS) capability to support the scheduling of activities, and commands on the mission timeline. In addition, this test verifies requirements related to the user manipulation of the timeline with regard to time and resources. Upon successful initialization of the General Scheduler window and Timeline window the test demonstrates the capability to schedule activities against the timeline on an impact and non-impact basis. Commands will then be scheduled against the timeline in the same manner. The final steps of this test demonstrate the capability to manipulate the timeline in terms of time and resources displays.

**Pass/Fail Assessment:**

Pass

**Date of Test:**

13 November 1996; EOC, Building 32, GSFC

**Test Conduct Summary:**

This successfully demonstrated that the user was able to use the general scheduler to schedule activities, commands and command procedures against the master plan of the mission timeline. Scheduling was conducted in impact and non-impact modes. The user was able to manipulate the timeline in terms of time and resources being displayed. Upon invoking the the scheduling

button for the first time, the General Scheduler window crashed. It was noted that the data base for the test was limited and that there was no interface with the FUI software or data bases.

**NCRs Written:**

ECSed04643

ECSed04645

ECSed04646

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
SCH-2020A	F-FUI-04000	The FOS shall provide the capability to display a mission schedule for a specified time period on a timeline display.	VP	
	F-FUI-04010	The FOS shall provide the capability to display TDRSS availability for a specified time period on a timeline display.	VP	
	F-FUI-04020	The FOS shall provide the capability to display resource usage with 2D line plots or bar graphs on a timeline display.	VP	
	F-FUI-04030	The FOS shall provide the capability to scroll by time and resource on the timeline display.	VP	
	F-FUI-04040	The FOS shall provide the capability to zoom in and out by time and resource on the timeline display .	VP	
	F-FUI-04060	The FOS shall provide the capability to display orbital events on the timeline display.	VP	
	F-FUI-04070	The FOS shall provide the capability to display the current date and time on the timeline display.	F	ECSed03982*
	F-FUI-04080	The FOS shall provide the capability to display the start and end times of activities and events on the timeline display.	VP	
	F-FUI-04110	The FOS shall provide the capability to display 'what-if' changes on the timeline display.	VP	
	F-FUI-04120	The FOS shall provide the capability to display activities and events on the timeline display.	VP	
	F-FUI-04290	The FOS shall provide the capability to display the amount of resources allocated to a particular instrument or spacecraft subsystem over time on the timeline.	VP	
	F-FUI-04300	The FOS shall provide the capability to display the total amount of resources available on a particular spacecraft over time on the timeline.	F	ECSed02450*
	F-PAS-00600	The FOS shall provide the capability for an authorized user to allocate the amount of the solid state recorder buffer available to specific users.	VP	



**Requirement Verification Status (cont.):**

Test Case	L4	Text	REQ Status	NCRs
	F-PAS-00605	The FOS shall provide the capability for an authorized user to predict resource usage and availability based on predefined limits.	VP	
	F-PAS-00610	The FOS shall provide the capability for an authorized user to predict the amount of resources required for a set of activities scheduled from a start to an end time in the mission schedule.	VP	
	F-PAS-00820	The FOS shall provide notification when the total allocation of resources exceeds predefined limits .	VP	
	F-PAS-01000	The FOS shall be able to schedule one activity in less than 4 seconds.	VP	
	F-PAS-10535	The FOS shall provide the capability to model the modes for the AM-1 spacecraft and instruments as defined in the PDB.	VP	

\* = NCR written during dry-run test phase

**Test Procedure Deviations:**

The only deviation from the test occurred when the General Scheduler crashed and the window was invoke manually by the startup script.

**Test Case #/Title:**

SCH-2030A ASTER Filter

**Reference to Test Documentation:**

FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:**

This test is designed to verify the Planning & Scheduling (PAS) capability to support the ingest and processing of ASTER Short Term Schedules (STS) and ASTER One Day Schedules (ODS). The test begins with the processing of a STS file. The STS file is processed by PAS and scheduled against the timeline master plan. The two files will contain activities that overlap and scheduling results in an overwrite/replacement of ASTER activities already scheduled. The same scenario is tested for ASTER One Day Schedule (ODS).

**Pass/Fail Assessment:**

Pass

**Date of Test:**

13 November 1996; EOC, Building 32, GSFC

**Test Conduct Summary:**

This test was successful upon demonstration of ASTER STS processing and scheduling against the master plan for SCHEDULE.

**NCRs Written:** None

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
SCH-2030A	F-PAS-10100	The FOS shall be able to receive DAR observation numbers.	VP	
	F-PAS-10300	The EOC shall receive a list of ASTER activities from the ASTER ICC as specified in the ASTER ICC ICD.	VP	

**Test Procedure Deviations:** There were no deviations within this test procedure.

**Test Case #/Title:** SCH-2040A ATC Load Generation

**Reference to Test Documentation:** FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:** This test verifies the Command Management Subsystem (CMS) capability to support the generation of an ATC load from Detailed Activity Schedule (DAS) received from Planning & Scheduling (PAS). This test also verifies the CMS capability to support the generation of a ground script over the same time period as the ATC upon receipt of a valid request from User Interface. The test begins with the creation of the DAS using Planning & Scheduling delivered tools. The DAS will include activities and commands that were scheduled against the master plan. Once the DAS is created, a request is sent to the CMS Schedule Controller process for expansion of the DAS and generation of the ATC load. Upon completion of the ATC load, the PAS receives a completion status from CMS. Because the ATC load generation is primarily a background process, this test will require analysis on the part of the test team to ensure the build and storage of the load, creation of the load report, integrated report and the update of the load catalog. After ATC load generation, this test verifies the CMS capability to support a FUI request for ground script generation. A request will be sent to CMS for ground script generation over the same time period as the DAS. The test will require analysis on the part of the test team to verify the contents of the ground script against the DAS and ATC load..

**Pass/Fail Assessment:** Pass

**Date of Test:** 19 November 1996; EOC, Building 32, GSFC

**Test Conduct Summary:**

The user was able to select a portion of the PAS timeline master plan and generate a DAS. The DAS was sent to the CMS Schedule Controller process for expansion and ATC load generation. ATC load generation consisted of the generation of the binary load, load report, integrated report and an update to the load catalog. Upon completion of the ATC load generation, CMS returned a generation complete status to the PAS load generator process. The user was able to invoke a FUI request for CMS to generate a ground schedule that corresponded to the start and stop time of the DAS used for ATC load generation. Through the offline analysis, the load content was proven to be valid. There were four NCRs written against this test; ecsed04733, ecsed04734, ecsed002806, and ecsed03509.

**NCRs Written:**

ECSed04733

ECSed04734

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
SCH-2040A	F-CMS-00105	The EOC shall expand spacecraft and instrument activities in the DAS into lists of absolute time commands.	VP	
	F-CMS-00110	The EOC shall provide the capability to modify the expansion of an activity by applying parameter values supplied as part of an activity request.	VP	
	F-CMS-00210	The EOC shall convert the command portion of each absolute time command from mnemonic to binary form.	VP	
	F-CMS-00215	The EOC shall convert the time tag of each absolute time command to the applicable spacecraft compatible format.	VP	
	F-CMS-00220	The EOC shall provide the capability to initiate generation of the ATC load which corresponds to a DAS upon request.	VP	
	F-CMS-00240	The EOC shall provide the capability to generate and append to the ATC load or partial load all necessary load control commands.	VP	
	F-CMS-00425	The EOC shall provide the capability to partition an ATC load at a user-requested boundary.	VP	
	F-CMS-00610	The EOC shall expand ground activities in the DAS into lists of time tagged ground directives.	VP	

**Requirement Verification Status (cont.):**

Test Case	L4	Text	REQ Status	NCRs
	F-CMS-00615	The EOC shall provide the capability to modify the expansion of a ground activity into ground directives by applying parameter values supplied as part of an activity request.	VP	
	F-CMS-00640	For each stored command that is scheduled to execute, the EOC shall provide a comment in the ground script which specifies the command and is time tagged with the same time as the stored command.	VP	
	F-CMS-10110	The EOC shall generate absolute time commands which are consistent with the format specified in ICD-106.	VP	
	F-CMS-10120	The EOC shall generate an ATC load in which the time tags associated with absolute time commands have a resolution of one second.	VP	
	F-CMS-10125	The EOC shall generate absolute time commands with time tags in the following format: 2 bits representing day, 18 bits representing milliseconds of day.	F	ECSe04734
	F-CMS-10250	The EOC shall append a load initiate command to the ATC load.	VP	
	F-CMS-10255	The EOC shall format ATC loads for uplink according to the CCSDS Telecommand packet protocols as specified in ICD-106.	VP	

**Test Procedure Deviations:**

There was no deviation from this test procedure.

**Test Case #/Title:**

SCH-2050A Microprocessor Load Generation

**Reference to Test Documentation:**

FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:**

This test is designed to verify the FOS capability to support the ingest of a microprocessor (MP) load contents file, validation of the contents file received and generation of a MP uplink load. From the FUI Load Manager window, the ingest process is invoked and the MP load contents file is moved from a source directory to a destination directory (ingest is internal only during release A2 testing). Once the ingest of a valid MP content file is complete, an attempt is made to specify the ingest of a filename that does not exist. This part of the test verifies the user is properly notified of an invalid ingest request. The test continues with the validation of the MP contents file received. The validation process includes

verification of the source, destination and size of the binary content file received. An attempt is made to edit the contents file and enter erroneous information to be introduced during the validation process (the user may be required to enter the data for StartAddress, StopAddress, Size, Name etc. at the FUI window). This part of the test verifies the proper reporting of validation errors to the user. After load validation, the test continues with MP uplink load generation. The Load Manager window 'Generate' toggle button is used to initiate a request to CMS to generate the MP uplink load. The final steps of the test verify that the load catalog is updated with an entry for the uplink load generated and that CMS has stored the load report, uplink load, load image and load contents file in the DMS database.

**Pass/Fail Assessment:**

Pass

**Date of Test:**

20 November 1996; EOC, Building 32, GSFC

**Test Conduct Summary:**

The success of this test was demonstrated by the FOS which provided the user with a capability to ingest a MP load content file into the EOC (ingest is internal during release A2). Following successful ingest, demonstration that the MP contents file was validated and used by CMS to generate a MP uplink load. CMS generation of the uplink load was invoked by a successful request from FUI Load Manager. The user demonstrated that CMS was capable of generating the load report and load image files. The user demonstrated that CMS was able to update the load catalog with an entry for the uplink load. The user also demonstrated that CMS was able to store the uplink load, load report, load image and load contents file in the DMS database. CMS and FUI also logged events to DMS during the execution of this test.

**NCRs Written:**

ECSEd04758

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
SCH-2050A	F-CMS-01305	The FOS shall provide the capability to accept a microprocessor load content imported from the Science Computing Facility (SCF).	VP	
	F-CMS-01310	The EOC shall validate the source, destination, and size of binary format instrument microprocessor load content generated externally to the FOS.	VPT	ECSed04758
	F-CMS-01320	The EOC shall generate a microprocessor load from a microprocessor load content.	VP	
	F-CMS-01325	The EOC shall generate and append to the microprocessor load all necessary load control commands.	VP	
	F-CMS-11310	The EOC shall provide the capability to format CERES, MISR, MODIS, and MOPITT instrument microprocessor load content into 1553B messages.	VP	
	F-CMS-11320	The EOC shall provide the capability to calculate the CRC for a CERES, MISR, MODIS, or MOPITT instrument microprocessor load.	VP	
	F-CMS-11330	The EOC shall provide the capability to append the load initiate command, including the load descriptor, start address, word count, and CRC to a CERES, MISR, MODIS, or MOPITT instrument microprocessor load.	VP	
	F-CMS-11340	The EOC shall format CERES, MISR, MODIS, and MOPITT microprocessor loads for uplink according to the CCSDS Telecommand packet protocols as specified in ICD-106.	VP	

**Test Procedure Deviations:** No deviations during this test procedure.

**Test Case #/Title:** SCH 2160A Generate RTS Load Contents

**Reference to Test Documentation:** FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:** This test is designed to verify the capability to support the generation of a Relative Time Command Sequence (RTS) load content file using a test tool driver available through the command management subsystem (CMS). This test demonstrates that an authorized user can create an ASCII text file with up to 16 commands, and invoke the test tool to generate a RTS load contents file, an uplink load file, an image load file and a report associated with that load. Another objective of this test is to verify CMS can store

the uplink and load images files and send them to DMS to be saved as a load catalog entry. Once the load contents are generated this test ensures the user can delete the RTS load and all the files associated with the RTS load including the load catalog entry with the use of the DeleteRTS test tool. The validation of the RTS load will be provided through the RTS Load Builder in Release B.

**Pass/Fail Assessment :** Pass

**Date of Test :** 21 November 1996; EOC, Building 32; GSFC

**Test Conduct Summary :** Generated RTS load contents with using a CMS test driver CreateRTS. Upon load generation the Meta Data server placed an uplink file, an image file, and a report (stored by CMS) in the appropriate CMS loads and reports directories respectively. Demonstrated that CMS is able to update the load catalog entry and send it to DMS. The user was also able to delete the RTS load and all the files associated with the RTS load including the load catalog entry using the DeleteRTS test tool.

**NCR List:** None

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
SCH-2160A	F-CMS-00820	The EOC shall provide the capability to convert the command portion of each relative time command from mnemonic to binary form.	VP	
	F-CMS-00830	The EOC shall provide the capability to convert the time tag of each relative time command to a spacecraft compatible format.	F	ECSe04456*
	F-CMS-00840	The EOC shall provide the capability to generate and append to the RTS load all necessary load control commands.	VP	
	F-CMS-10710	The EOC shall generate SCC relative time commands which are consistent with the format specified in ICD-106.	VP	
	F-CMS-10730	The EOC shall format RTS loads for uplink according to the CCSDS Telecommand packet protocols as specified in ICD-106.	VP	
	F-CMS-10740	The EOC shall append a load initiate command to the RTS load.	VP	

\* = NCR written during the dry-run test phase

**Test Procedure Deviations:** Test completed successfully without deviations.

<b>Test Case #/Title:</b>	SCH-2200A Validation and Generation of Table Load Contents
<b>Reference to Test Documentation:</b>	FOS Release A Integration & Test Procedures (322-CD-010-003)
<b>Test Summary:</b>	This test is designed to verify an authorized user's generation of a Table Load content file using the load builder tools available through FUI. In addition, the authorized user is provided a pre-defined table template with default parameter values that can be modified accordingly. This test demonstrates that the user is to invoke the Table Load Builder to input, validate, and generate a table load. Once generation is complete this test will verify that CMS has stored the uplink load file, load image file, load report, load contents file, and a load catalog entry in the DMS database. The FUI Load manger tool will be used in Release B to ingest a table load from an IST and SCF.
<b>Pass/Fail Assessment:</b>	Pass
<b>Date of Test:</b>	21 November, 1996; EOC, Building 32, GSFC
<b>Test Conduct Summary:</b>	User was able to select a Table Template using the Table Load Builder. User modified the contents, validated and generated the table load. Once the Table Load contents were validated against the Table buffer characteristics defined in the Project Data Base an uplink load, image load, load report, load contents file, and a load catalog entry associated with that table load were generated. Confirmed the user is properly notified when the invalid load contents were detected during the validation process. Binary conversion of table load contents conformed to Mil STD 1750A.
<b>NCR List:</b>	ECSed04757



### Requirement Verification Status:

Test Case	L4	Text	REQ Status	NCRs
SCH-2200A	F-CMS-01010	The FOS shall provide the capability to build the content of a table load.	VP	
	F-CMS-01020	The FOS shall provide the capability to build the content of a table load based on a previously defined table content.	VP	
	F-CMS-01025	The FOS shall provide the capability to accept a Table load content imported from the Science Computing Facility (SCF).	F	ECSed04757
	F-CMS-01028	The FOS shall provide the capability to accept a Table load content imported from the Software Development and Validation Facility (SDVF).	F	ECSed04757
	F-CMS-01029	The EOC shall validate the source and destination of table load content generated externally to the FOS.	UNV	ECSed04757
	F-CMS-01030	The FOS shall provide the capability to validate the contents of a table load.	VP	
	F-CMS-01110	The EOC shall provide the capability to generate a table load from a valid table load content.	VP	
	F-CMS-01120	The EOC shall provide the capability to convert each field of the table from its table load contents form to its spacecraft usable form.	VP	
	F-CMS-01130	The EOC shall generate and append to the table load all necessary load control commands.	VP	
	F-CMS-11185	The EOC shall format table loads for uplink according to the CCSDS Telecommand packet protocols as specified in ICD-106.	VP	
	F-CMS-11190	The EOC shall append a load initiate command to the table load.	VP	
	F-FUI-05100	The FOS shall provide an authorized user the capability to enter table data using a pre-defined template.	VPT	ECSed04424 *
	F-FUI-05110	The FOS shall validate the table data entered by the user.	VP	
	F-FUI-05115	The FOS shall display any validation errors that are detected.	VP	
	F-FUI-05120	The FOS shall provide an authorized user the capability to request the generation of a table load.	VPT	ECSed04424 *
	F-FUI-05125	The FOS shall notify the requester when a table load has been successfully generated.	VP	
	F-FUI-05130	The FOS shall display any errors encountered during the table load generation process.	VP	

\* = NCR written during dry-run test phase

**Test Procedure Deviations:** The load ingest steps were not performed because that functionality is a Release B capability.

Prior to starting the test table load definitions had to be ingested PDB. These table definitions were defined according to ICD-106 (Note: The actual table definitions will be provided by the FOT.)

Used Mil STD 1750A standards to verify load contents of the table load.

### **3.3.2.7 Real-time System/String Initialization Thread Tests**

This section presents the detailed result information for real-time system/string initialization thread tests RCM-2000A, RCM-2010A, and RCM-2020A.

**Test Case #/Title:** RCM-2000A / Logical String Configuration & Control

**Reference to Test Documentation:** FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:** This test is designed to verify the ability to configure the FOS resources in support of default, real-time and simulation string resources. The test begins with the startup of RealTimeServer and User station default processes. Configuration status pages are displayed, verifying the default configuration. Following Several iterations of creating specific logical strings, telemetry connection is requested for viewing single and multiple channel telemetry. Finally, error condition handling is verified, including attempts to create existing strings, connect to non-existent strings, and request invalid string resources.

**Pass/Fail Assessment:** Pass

**Date of Test:** 12 November, 1996; EOC, Building 32, GSFC

**Test Conduct Summary:** All requirements were verified through formal testing on 11/12/96. The test was performed without any major software or hardware problems. One(1) requirement was marked as a failure (F-FUI-07700) due to non-existent software, while two(2) others were marked as Verified-Partial (F-FUI-17600 & F-RMS-00010); the remaining requirements passed. Several NCR's were generated during testing.

**NCR list:** ECSed04759                      ECSed04760

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCR's
RCM-2000A	F-FOS-00420	The FOS shall require unique sessions for each operator that access the FOS.	VP	
	F-FUI-07700	The FOS shall provide a status window that displays: a. Universal Time Coordinated (UTC) b. spacecraft time c. count down clock d. current orbit number e. data source (real-time, replay, simulated) f. cycle count g. current telemetry format h. current telemetry rate i. spacecraft identifier	F	ECSeD04759
	F-FUI-08100	The FOS shall provide a user the capability to submit a resource service request.	VP	
	F-FUI-17600	The FOS shall display data base information about the master and major cycles that the telemetry value is extracted from.	VPT	ECSeD04760
	F-RMS-00010	The EOC shall support concurrent real-time operations for up to seven (7) spacecraft and their instruments.	VPT	ECSeD02487 *
	F-RMS-00020	The EOC shall be capable of accepting default ground system information at system startup.	VP	
	F-RMS-00035	The EOC shall allow EOC operators to specify a version of the project data base to use in processing data.	VP	
	F-RMS-00040	The EOC shall allow EOC operators to identify EOC resources for operational mode.	VP	
	F-RMS-00050	The EOC shall allow EOC operators to identify EOC resources for test mode.	VP	
	F-RMS-00060	The EOC shall allow EOC operators to identify EOC resources for training mode.	VP	
	F-RMS-00070	The EOC shall provide an EOC operator access to real-time data.	VP	
	F-RMS-00130	The EOC shall provide an IST operator access to real-time data.	VP	

\* = NCR written during dry-run test phase

**Test Procedure Deviation:** None

**Test Case #/Title:** RCM-2010A NCC GCMR Processing

**Reference to Test Documentation:** FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:** This test verifies the ability to send various Ground Configuration Message Requests (GCMRs) to an NCC dummy emulator, and process GCM Status and GCM Disposition messages received as a result of the NCC dummy emulator's response to ground configuration requests. Examples of GCMRs transmitted include User Reacquisition Requests, Forward Link Sweep Requests, Forward Link Reconfiguration Requests, Expand User Frequency Uncertainty Requests and Doppler Compensation Inhibit/Enable Requests).

**Pass/Fail Assessment:** Pass

**Date of Test:** 13 November 1996; EOC, Building 32, GSFC

**Test Conduct Summary:** All requirements were verified through formal testing on 11/13/96. The only problem encountered during formal testing was the inability of the EOC to display the Status and Disposition messages incrementing in the custom built page (NCC\_COM1), an NCR was generated for this problem.

**NCRs Written:** None

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCR's
RCM-2010A	F-RMS-04020	The EOC shall provide the capability to send the following Ground Configuration Message Requests to the NCC: a. User Reacquisition Request b. User Reconfiguration Request c. Forward Link Sweep Request d. Forward Link EIRP Reconfiguration Request e. Expand User Frequency Uncertainty Request f. Doppler Compensation Inhibit/Enable Request	VP	
	F-RMS-04100	The EOC shall provide the capability to receive and process GCM Status messages from the NCC.	VP	
	F-RMS-04110	The EOC shall provide the capability to receive and process GCM Disposition messages from the NCC.	VP	

**Test Procedure Deviations:** None

**Test Case #/Title:** RCM-2020A      Off-line Archive to SDPS

<b>Reference to Test Documentation:</b>	FOS Release A Integration & Test Procedures (322-CD-010-003)
<b>Test Summary:</b>	This test is designed to verify the basic capabilities of the EOC-SDPS interface, primarily to transmit archive files to the SDPS including AM-1 schedules, telemetry packets, event messages and configuration information.
<b>Pass/Fail Assessment:</b>	Pass
<b>Date of Test:</b>	18 November 1996;EOC, Building 32, GSFC
<b>Test Conduct Summary:</b>	The FOS/EOC software demonstrated the capability to send and retrieve via ftp directive, several text files to the SDPS (iclg2sun = machine name). This test was conducted without any major problems and 1 NCR was opened during the test period.
<b>NCRs Written:</b>	None
<b>Requirement Verification Status:</b>	Requirements for Release A were previously moved to Release B. The test was still performed to demonstrate the confidence in the FOS EOC/SDPS interface software.
<b>Test Procedure Deviation:</b>	None

### 3.3.2.8 Ground Script Commanding Thread Tests

This section presents the detailed result information for tests CMD-2000A (Command Authorization), CMD-2005A (Ground Script Control), CMD-2010A (Manual Command Processing, CMD-2015A (Ground Script Command Processing) and CMD-2017A (Ground Script Manipulation).

<b>Test Case #/Title:</b>	CMD-2000A	Command Authorization
<b>Reference to Test Documentation:</b>	FOS Release A Integration & Test Procedures (322-CD-010-003)	
<b>Test Summary:</b>	<p>This test is designed to verify the FOS capability to support a user request for command authorization. This test demonstrates that a user is able to input the necessary ECL directives to request Command Activity Controller (CAC) privileges at the user's workstation, and that the FOS rejects any request for command authority made by a user that does not have appropriate privileges.</p> <p>The secondary objective of this test is to verify the FOS capability to support FUI processing of command directives that are entered manually in real time at the</p>	

CAC user workstation and performs a syntax check, and the Command Subsystem performs a validation on each command entered for transmission.

**Pass/Fail Assessment:**

Pass

**Date of Test :**

20 November 1996; EOC, Building 32, GSFC

**Test Conduct Summary :**

Verified that all unauthorized requests for command authorization were rejected and authorized requests are granted. Reviewed event history to confirm all reassignments of CAC privileges. Verified there is a single point of command throughout the duration of the test. Verified the FUI subsystem recognizes command directives entered by a user with CAC privilege.

**NCRs Written:**

ECSed04701

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
CMD-2000A	F-CMD-01310	The EOC shall permit an authorized EOC operator to issue individual commands, in real time.	VP	
	F-CMD-03410	The EOC shall verify prior to acceptance of a command that the command was issued from the user currently having the command authority.	VP	
	F-RMS-01010	The EOC shall provide the capability to authorize an EOC operator to command an EOC spacecraft.	VP	
	F-RMS-01020	The EOC shall ensure a single point of command for a given spacecraft.	VP	
	F-RMS-01030	The EOC shall accept, validate, and process EOC operator requests to acquire the spacecraft command privilege.	VP	

**Test Procedure Deviations:**

Test completed successfully without deviations.

**Test Case #/Title:**

CMD-2005A Ground Script Control

**Reference to Test Documentation:**

FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:**

This test demonstrates that a user with CAC privileges is provided the tools necessary to initiate the execution of a ground script, derived from a Detailed Activity Schedule (DAS), and manipulate ground script execution. Manipulation of this ground script includes; enable/disable of individual directives, transferring the

execution to a directive, suspend, resume and termination of the currently executing ground script. In addition, testing verifies the displays provided to the users for validating proper execution of ground script directives.

**Pass/Fail Assessment:**

Pass

**Date of Test:**

November 21, 1996

**Test Conduct Summary:**

Successfully demonstrated of CAC capabilities to selected a valid ground script, initiated execution of the ground script, manipulated ground script control and terminated the ground script via user directives. The ground script processed real-time command and ground directives for the spacecraft.

**NCRs Written:**

None

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
CMD-2005A	F-CMD-01317	The EOC shall be capable of transmitting commands from a ground script.	VP	
	F-CMD-03210	The EOC shall determine a specific command as critical based on a its definition.	VP	
	F-CMD-03215	The EOC shall require a user authorization (allow or cancel) prior to uplinking a critical command, regardless of its origin (operator input, command procedure, or ground script).	VP	
	F-CMD-03225	The EOC shall prompt the user for a critical command authorization.	VP	
	F-CMD-03410	The EOC shall verify prior to acceptance of a command that the command was issued from the user currently having the command authority.	VP	
	F-FUI-06300	The FOS shall display the following information for the active ground script: a. ground script time frame (UTC start and stop time) b. ground script status (active or suspended) c. spacecraft Id d. (deleted) e. (deleted) f. command confirmation mode g. bias time	VP	
	F-FUI-06305	The FOS shall allow a user to view executed ground script directives, the current ground script directive, and future ground script directives.	VP	

### Requirement Verification Status (cont.):

Test Case	L4	Text	REQ Status	NCRs
	F-FUI-06315	The FOS shall execute local directives encountered in the ground script at the specified execution time.	VP	
	F-FUI-06320	The FOS shall process ground script command directives for the spacecraft and its instruments at the specified execution time.	VP	
	F-FUI-06360	The EOC shall provide the CAC the capability to select a directive in the ground script.	VP	
	F-FUI-06365	The EOC shall provide the CAC the capability to disable directives in the ground script.	VP	
	F-FUI-06370	The EOC shall provide the CAC the capability to enable directives in the ground script.	VP	
	F-FUI-06375	The EOC shall provide the CAC the capability to transfer execution to a directive in the ground script.	VP	
	F-FUI-06385	The EOC shall provide the CAC the capability to confirm a critical command directive.	VP	
	F-FUI-06390	The EOC shall provide the CAC the capability to cancel a command directive.	VP	
	F-FUI-06395	The EOC shall provide the CAC the capability to set (on/off) the command confirmation mode.	VP	
	F-FUI-06410	The EOC shall provide the CAC the capability to terminate the current ground script.	VP	
	F-FUI-06415	The EOC shall provide the CAC the capability to start a ground script.	VP	
	F-FUI-06420	The EOC shall provide the CAC the capability to suspend execution of the ground script.	VP	
	F-FUI-06425	The EOC shall provide the CAC the capability to resume execution of the ground script.	VP	
	F-FUI-06445	The FOS shall provide a user the capability to search the executing ground script for a specified command.	F	ECSed04231*
	F-FUI-06450	The FOS shall provide a user the capability to search the executing ground script for a specified time stamp.	VP	
	F-FUI-06455	The FOS shall provide a user the capability to search the executing ground script for a specified text string.	VP	
	F-FUI-06460	The FOS shall provide a user the capability to print the current executing ground script.	F	ECSed04539*

\* = NCR written during dry-run test phase



<b>Test Procedure Deviations:</b>	Test completed successfully without deviations.									
<b>Test Case #/Title:</b>	CMD-2010A Manual Command Processing									
<b>Reference to Test Documentation:</b>	FOS Release A Integration & Test Procedures (322-CD-010-003)									
<b>Test Summary:</b>	This test is designed to verify the FOS capability to support FUI processing of command directives that are entered manually in real-time via the Command Control window (CCW) at the CAC user workstation. This test demonstrates that the FUI subsystem is capable of recognizing commands with valid and invalid submnemonics, critical commands, and prerequisite state check commands. However, if no submnemonic values are specified, a default value is assigned according to the PDB definition. In addition, the transfer frame header information and application data should be formatted according to the CCSDS document and verified during post test analysis.									
<b>Pass/Fail Assessment:</b>	Pass									
<b>Date of Test:</b>	20 November 1996; EOC, Building 32, GSFC									
<b>Test Conduct Summary:</b>	The authorized user was able to override or cancel the command directive when prerequisite state check failed the command directive. All manually entered invalid submnemonic command definitions were rejected (based on the definition in the command PDB) and the user received a an error message in the CCW indicating "subfield error". However, an NCR was written because if a submnemonic value was not specified the system did not assign the default value, and the user received a "subfield error". The user was able to allow or cancel all critical commands. The confirmed transfer frame header and application data coincided with the information provided in the CCSDS documentation.									
<b>NCRs Written:</b>	<table border="0"> <tr> <td>ECSed04773</td> <td>ECSed04763</td> <td>ECSed03987</td> </tr> <tr> <td>ECSed02714</td> <td>ECSed03872</td> <td>ECSed04071</td> </tr> <tr> <td>ECSed04712</td> <td></td> <td></td> </tr> </table>	ECSed04773	ECSed04763	ECSed03987	ECSed02714	ECSed03872	ECSed04071	ECSed04712		
ECSed04773	ECSed04763	ECSed03987								
ECSed02714	ECSed03872	ECSed04071								
ECSed04712										

### Requirement Verification Status:

Test Case	L4	Text	REQ Status	NCRs
CMD-2010A	F-CMD-01120	The EOC shall be capable of transmitting commands to the EOS spacecraft via EDOS using the SN (Space Network).	UNV	ECSed04712
	F-CMD-01160	The EOC shall be capable of transmitting commands to EDOS via Ecom.	UNV	ECSed04712
	F-CMD-02110	The EOC shall assemble standard, fixed length packets from the command structures formatted for on board execution.	F	ECSed03987
	F-CMD-02135	The EOC shall append the necessary acquisition sequence to the CLTU(s) prior to transmission to EDOS.	VP	
	F-CMD-02140	The EOC shall append the necessary gap to the CLTU prior to transmission to EDOS.	UNV	ECSed03872
	F-CMD-02210	The EOC shall validate all real time commands and ensure that the commands accepted conform to the command definition.	VP	
	F-CMD-02215	The EOC shall provide the capability to assemble commands from command mnemonic requests.	VP	
	F-CMD-02220	The EOC shall assign default values, if available, to command data portions if not specified by the user.	F	ECSed04773
	F-CMD-02225	The EOC shall provide the capability to assemble commands with submnemonic specifications.	VP	
	F-CMD-02230	The EOC shall use a predefined default value for a submnemonic when one is not explicitly provided.	F	ECSed04773
	F-CMD-02235	The EOC shall require submnemonic values for commands having submnemonic specifications, but lacking default values.	UNV	ECSed04773
	F-CMD-02240	The EOC shall provide the user the capability to view the most current command in binary (numeric) format.	VP	
	F-CMD-02245	The EOC shall accept command submnemonic values specified as states.	VP	
	F-CMD-02250	The EOC shall accommodate up to eight (8) states per command.	VPT	ECSed04773
	F-CMD-02255	The EOC shall allow for a third order polynomial conversion of submnemonic values.	UNV	ECSed04071
	F-CMD-02260	The EOC shall be capable of range checking submnemonic values entered by the user.	VP	
	F-CMD-03110	The EOC shall provide the capability to verify up to four (4) telemetry points prior to command transmission.	F	ECSed04740*
	F-CMD-03115	The EOC shall allow for overriding (disablement) of prerequisite checking.	VP	

**Requirement Verification Status (cont.):**

Test Case	L4	Text	REQ Status	NCRs
	F-CMD-03125	The EOC shall suppress transmission of commands which fail prerequisite checking.	VP	
	F-CMD-03127	The EOC shall allow the operator to override a command prerequisite state check failure.	VP	
	F-CMD-03130	The EOC shall deem as failing prerequisite check those commands referencing telemetry points that have static data values.	VP	
	F-CMD-03133	The FOS shall report the status of each prerequisite check to the user.	VP	
	F-CMD-03135	The FOS shall report to the user the mnemonic, required values, current values, and current state which cause a prerequisite check to fail.	VPT	ECSed04740 *
	F-CMD-03410	The EOC shall verify prior to acceptance of a command that the command was issued from the user currently having the command authority.	VPT	ECSed04740 *
	F-CMD-04115	The EOC shall archive all uplinked information, in the format transmitted from the EOC.	VPT	ECSed02714 ECSed04763
	F-CMD-04120	The FOS shall notify the user when a command is transmitted.	VP	
	F-CMD-11210	The EOC shall uplink at a rate of 10 kilobits per second (kbps) when the control center is configured for transmission utilizing SN SSA service and the AM1 High Gain antenna.	UNV	ECSed04712
	F-CMD-11226	The EOC shall convert all command data to NRZ-M format including the data to be transmitted, the synchronization bits, and the tracking bits.	VP	
	F-CMD-12130	The EOC shall utilize a single virtual channel for uplink.	VPT	ECSed04712
	F-CMD-12245	The EOC shall generate commands in 1553-B format.	VP	
	F-CMD-14313	The EOC shall address all commands to the active CTIU by default.	VP	
	F-FOS-00025	The EOC shall use Ecom for flight operations data transfers.	UNV	ECSed04712
	F-FOS-00347	The EOC shall send command data to EDOS for subsequent uplink to the EOS spacecraft.	UNV	ECSed04712
	F-FUI-06337	The EOC shall provide the capability to request an override of a prerequisite state check failure.	VP	

\* = NCR written during dry-run test phase

<b>Test Procedure Deviations:</b>	Modified steps 13-20 to reflect the correct syntax for submnemonics. Modified steps 24-28 to reflect the correct way to verify prerequisite state check commands.  Created a dynamic page containing the four telemetry mnemonics associated with the prerequisite state check commands.  Incorporated telemetry generator startup tests into the test procedure document.		
<b>Test Case #/Title:</b>	CMD-2015A	Ground Script Command Processing	
<b>Reference to Test Documentation:</b>	FOS Release A Integration & Test Procedures (322-CD-010-003)		
<b>Test Summary:</b>	This test is designed to verify the FOS capability to process critical, submnemonic, and prerequisite state check commands that are contained as part of a ground script. Once, that ground script is executed if the prerequisite state check fails the user can override or cancel the command directive. This test also, demonstrates that for commands issued as part of a ground script, the FOS is capable of recognizing and executing valid submnemonic command definitions. In addition, any commands that are manually entered by the CAC from the Command Control Window (via the Command Input Line) will be inserted/merged into the ground script and validated against definitions that reside in the FOS database.		
<b>Pass/Fail Assessment :</b>	Pass		
<b>Date of Test :</b>	21 November 1996; EOC, Building 32, GSFC		
<b>Test Conduct Summary :</b>	The authorized user was able to override or cancel the command directive when prerequisite state check failed, cancel or allow a critical command using the FUI interface options provided by the Command Control window. All manually entered commands were syntax checked and validated based on the definition in the command PDB. All invalid commands were rejected by the FOS. NCRs were written identifying problems with terminating a ground script. The Kill process used in the CCW was not functioning properly.		
<b>NCR List:</b>	ECSed04763	ECSed03987	ECSed02714
	ECSed04773	ECSed04712	

### Requirement Verification Status:

Test Case	L4	Text	REQ Status	NCRs
CMD-2015A	F-CMD-01120	The EOC shall be capable of transmitting commands to the EOS spacecraft via EDOS using the SN (Space Network).	UNV	ECSe04712
	F-CMD-01160	The EOC shall be capable of transmitting commands to EDOS via Ecom.	UNV	ECSe04712
	F-CMD-02110	The EOC shall assemble standard, fixed length packets from the command structures formatted for on board execution.	F	ECSe03987
	F-CMD-02210	The EOC shall validate all real time commands and ensure that the commands accepted conform to the command definition.	VP	
	F-CMD-02215	The EOC shall provide the capability to assemble commands from command mnemonic requests.	VP	
	F-CMD-02220	The EOC shall assign default values, if available, to command data portions if not specified by the user.	F	ECSe04773
	F-CMD-02225	The EOC shall provide the capability to assemble commands with submnemonic specifications.	VP	
	F-CMD-02230	The EOC shall use a predefined default value for a submnemonic when one is not explicitly provided.	F	ECSe04773
	F-CMD-02235	The EOC shall require submnemonic values for commands having submnemonic specifications, but lacking default values.	UNV	ECSe04773
	F-CMD-02240	The EOC shall provide the user the capability to view the most current command in binary (numeric) format.	VP	
	F-CMD-03110	The EOC shall provide the capability to verify up to four (4) telemetry points prior to command transmission.	F	ECSe04740*
	F-CMD-03115	The EOC shall allow for overriding (disablement) of prerequisite checking.	VP	
	F-CMD-03125	The EOC shall suppress transmission of commands which fail prerequisite checking.	VP	
	F-CMD-03127	The EOC shall allow the operator to override a command prerequisite state check failure.	VP	
	F-CMD-03130	The EOC shall deem as failing prerequisite check those commands referencing telemetry points that have static data values.	VP	
	F-CMD-03133	The FOS shall report the status of each prerequisite check to the user.	VP	

### Requirement Verification Status (cont.):

Test Case	L4	Text	REQ Status	NCRs
	F-CMD-03135	The FOS shall report to the user the mnemonic, required values, current values, and current state which cause a prerequisite check to fail.	VPT	ECSeD04740*
	F-CMD-03410	The EOC shall verify prior to acceptance of a command that the command was issued from the user currently having the command authority.	VPT	ECSeD04740*
	F-CMD-04115	The EOC shall archive all uplinked information, in the format transmitted from the EOC.	VPT	ECSeD02714 ECSeD04763
	F-CMD-04120	The FOS shall notify the user when a command is transmitted.	VP	
	F-CMD-11210	The EOC shall uplink at a rate of 10 kilobits per second (kbps) when the control center is configured for transmission utilizing SN SSA service and the AM1 High Gain antenna.	UNV	ECSeD04712
	F-CMD-12130	The EOC shall utilize a single virtual channel for uplink.	VPT	ECSeD04712
	F-CMD-12245	The EOC shall generate commands in 1553-B format.	VP	
	F-CMD-14313	The EOC shall address all commands to the active CTIU by default.	VP	
	F-FOS-00347	The EOC shall send command data to EDOS for subsequent uplink to the EOS spacecraft.	UNV	ECSeD04712
	F-FUI-06335	The FOS shall suspend ground script execution if an enabled prerequisite state check fails.	UNV	ECSeD04712
	F-FUI-06337	The EOC shall provide the capability to request an override of a prerequisite state check failure.	VP	
	F-FUI-06395	The EOC shall provide the CAC the capability to set (on/off) the command confirmation mode.	VPT	
	F-FUI-06400	The EOC shall provide the CAC the capability to confirm pending commands when command confirmation is enabled.	UNV	new**
	F-FUI-06405	The EOC shall provide the CAC the capability to cancel pending commands when command confirmation is enabled.	UNV	new**
	F-FUI-06410	The EOC shall provide the CAC the capability to terminate the current ground script.	VPT	new**

\* = NCR written during dry-run test phase

\*\* = NCR number not yet available from DDTs at the time of this publication

**Test Procedure Deviations:** The PAS software did not access the FOS PDB in Release A. So, the procedure had to be modified to reflect the submnemonic definitions defined in the PAS database. This scenario only refers to executing a ground script that was created by generating a DAS.

**Test Case #/Title:** CMD-2017A Ground Script Manipulation

**Reference to Test Documentation:** FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:** This test demonstrates that a user with CAC privileges is provided the tools necessary to initiate the execution of a ground script and manipulate ground script execution. Manipulation of this ground script includes; merging a procedure, suspend, resume and termination of the currently executing ground script.

**Pass/Fail Assessment:** Pass

**Date of Test:** 21 November, 1996; EOC, Building 32, GSFC

**Test Conduct Summary:** Successfully demonstrated the CAC's capability to select a valid ground script. Initiated execution of the ground script, merged procedures, suspended, resumed the ground script control and terminated the ground script via user directives.

**NCRs Written:** None

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
CMD-2017A	F-FUI-06360	The EOC shall provide the CAC the capability to select a directive in the ground script.	VP	
	F-FUI-06365	The EOC shall provide the CAC the capability to disable directives in the ground script.	VP	
	F-FUI-06370	The EOC shall provide the CAC the capability to enable directives in the ground script.	VP	
	F-FUI-06390	The EOC shall provide the CAC the capability to cancel a command directive.	VP	
	F-FUI-06410	The EOC shall provide the CAC the capability to terminate the current ground script.	VP	
	F-FUI-06420	The EOC shall provide the CAC the capability to suspend execution of the ground script.	VP	
	F-FUI-06425	The EOC shall provide the CAC the capability to resume execution of the ground script.	VP	
	F-FUI-06430	The EOC shall provide the CAC the capability to merge procedures with the current executing ground script directives.	VP	

**Requirement Verification Status (cont.):**

Test Case	L4	Text	REQ Status	NCRs
	F-FUI-06435	The EOC shall provide the CAC the capability to merge a directive with the current executing ground script directives.	VP	
	F-FUI-06440	The FOS shall provide a user the capability to search the executing ground script for a specified procedure reference.	VP	
	F-CMD-01315	The EOC shall be capable of transmitting commands from a command procedure consisting of more that one command.	VP	

**Test Procedure Deviations:** Test completed successfully without deviations.

**3.3.2.9 Real-time Monitoring Thread Tests**

The following section presents the detailed result information for tests TLM-2000A (Decommuration - H&S/Standby Telemetry, TLM-2010A (Decommuration - Housekeeping Telemetry), TLM-2020A (Engineering Unit Conversion, TLM-2022A (Simultaneous I & Q Channel Data Receipt), TLM-2025A (Multi-byte Parameter Processing), TLM-2027A (Limits Processing), TLM-2030A (Real-time Telemetry Data Dropout), TLM-2040A (Real-time Telemetry Graph Display), TLM-2050A (Real-time Telemetry Spreadsheet Tables), TLM-2080A (Real-time Telemetry Archive)

**Test Case #/Title:** TLM 2000A Decommuration - Health & Safety/Standby Telemetry

**Reference to Test Documentation:** FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:** This test is designed to verify the ability to receive spacecraft/instrument Health & Safety and Standby CTIU EDOS Data Units (EDUs), extract CCSDS telemetry packets from the EDUs, extract all header information, extract the telemetry information from the packet application data field, and decommutate the data based on the packet APID and associated decommutation information residing in the PDB.

Following sign-on, alphanumeric telemetry pages which include parameter and associated parameter Decom value displays are invoked at the user station. The telemetry data driver is initiated, broadcasting Health & Safety telemetry onto the FOS LAN in the form of EDUs. As telemetry packets are received and the telemetry



information decommutated, telemetry displays are viewed and snapped at specified times. Raw parameter values residing on alphanumeric displays are analyzed post-test to ensure decommutated values match scripted raw values for specified mnemonics. The above steps are repeated for Standby CTIU telemetry processing.

**Pass/Fail Assessment:**

Pass

**Date of Test:**

13 November 1996; EOC, Building 32, GSFC

**Test Conduct Summary:**

All Health & Safety/Standby telemetry header and data mnemonics were decommutated as specified and match data driven values. Values as seen on multiple user stations matched data driven values. Static and NODATA flags were disabled from alphanumeric telemetry displays upon active data periods. Two new NCRs were written during this test. All parameters, except one, were successfully decommutated and there was only one time stamp parameter in the database. The system needs to be able to display spacecraft time and ground receipt time.

**NCRs Written:**

None

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
TLM-2000A	F-TLM-00110	The EOC shall be capable of receiving EOS spacecraft and instrument telemetry.	VP	
	F-TLM-00135	The EOC shall be capable of receiving telemetry in either EDU or CCSDS packet format.	VP	
	F-TLM-00210	The EOC shall accept EDOS Data Units (EDUs) containing spacecraft and instrument telemetry data.	VP	
	F-TLM-00215	The EOC shall extract the EDU Service Header (ESH) containing data quality, accounting, and EDOS ground receipt date and time information from the EDU.	VP	
	F-TLM-00220	The EOC shall extract the Service Data Unit (SDU) containing a CCSDS Version-1 spacecraft or instrument telemetry packet from the EDU.	VP	
	F-TLM-00410	The FOS shall accept a CCSDS Version-1 format telemetry packet of a predefined type and length.	VP	

### Requirement Verification Status (cont.):

Test Case	L4	Text	REQ Status	NCRs
	F-TLM-00440	The FOS shall extract from the telemetry packet primary header field the following: a. The 11-bit packet APID. b. The 14-bit packet sequence count. c. The two (2) octet packet length count.	VP	
	F-TLM-00450	The FOS shall be capable of extracting from the telemetry packet application data field the following: a. An optional CCSDS packet secondary header field . b. The packet application process telemetry information.	VPT	ECSed04752*
	F-TLM-00490	The FOS shall provide the capability to convert the packet time stamp according to a specified spacecraft time code conversion algorithm.	VP	
	F-TLM-00610	The FOS shall initially mark all defined telemetry parameters as being static and as having no data available.	VP	
	F-TLM-00635	The FOS shall mark a parameter as being active when it has been successfully decommutated.	VP	
	F-TLM-10410	The FOS shall accept AM-1 CCSDS format telemetry packets of a predefined type and length.	VP	
	F-TLM-10425	The FOS shall accept AM-1 208 octet health and safety telemetry packets.	VP	
	F-TLM-10435	The FOS shall accept AM-1 208 octet standby CTIU telemetry packets.	VP	
	F-TLM-10440	The FOS shall extract from the telemetry packet primary header field the following: a. The 11-bit packet APID. b. The 14-bit packet sequence count. c. The two (2) octet packet length count.	VP	
	F-TLM-10465	The FOS shall be capable of extracting the 193 octet telemetry information from the 1 Kbps AM-1 health and safety packet application data field.	VP	
	F-TLM-10475	The FOS shall be capable of extracting the 193 octet telemetry information from the 1 Kbps AM-1 standby CTIU packet application data field.	VP	
	F-TLM-10490	The FOS shall provide the capability to convert the packet time stamp according to the CCSDS Day Segmented Time Code time conversion algorithm.	VP	

**Requirement Verification Status (cont.):**

Test Case	L4	Text	REQ Status	NCRs
	F-TLM-10525	The FOS shall determine the decommutation algorithm for a telemetered AM-1 CCSDS packet based upon the packet application process identifier (APID) and packet sequence count fields.	VP	

\* = written during the dry-run test phase

**Test Procedure Deviations :** STRING DISCONNECT is not operational at this time. It was removed from the procedure.

In step 22, the system was brought down and back up to test Standby telemetry.

**Test Case #/Title:** TLM-2010A Decommutation - Housekeeping Telemetry

**Reference to Test Documentation:** FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:** This test is designed to verify the ability to receive spacecraft/instrument Housekeeping Data Units (EDUs), extract CCSDS telemetry packets from the EDUs, extract all header information, extract the telemetry information from the packet application data field, and decommutate the data based on the packet APID and associated decommutation information residing in the PDB.

Following sign-on, alphanumeric telemetry pages which include parameter and associated parameter Decom value displays are invoked at the user station. The telemetry data driver is initiated, broadcasting Housekeeping telemetry onto the FOS LAN in the form of EDUs. As telemetry packets are received and the telemetry information decommutated, telemetry displays are viewed and snapped at specified times. Raw parameter values residing on alphanumeric displays are analyzed post-test to ensure decommutated values match scripted raw values for specified mnemonics.

**Pass/Fail Assessment:** Pass

**Date of Test:** 13 November 1996; EOC, Building 32, GSFC

**Test Conduct Summary:** All housekeeping telemetry header and data mnemonics were decommutated as specified and matched data driven values. Values as seen on multiple user stations matched data driven values. Static and NODATA flags were

disabled from alphanumeric telemetry displays upon active data periods. No new NCRs were written during this test.

**NCRs Written:**

None

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
TLM-2010A	F-TLM-00110	The EOC shall be capable of receiving EOS spacecraft and instrument telemetry.	VP	
	F-TLM-00135	The EOC shall be capable of receiving telemetry in either EDU or CCSDS packet format.	VP	
	F-TLM-00210	The EOC shall accept EDOS Data Units (EDUs) containing spacecraft and instrument telemetry data.	VP	
	F-TLM-00215	The EOC shall extract the EDU Service Header (ESH) containing data quality, accounting, and EDOS ground receipt date and time information from the EDU.	VP	
	F-TLM-00220	The EOC shall extract the Service Data Unit (SDU) containing a CCSDS Version-1 spacecraft or instrument telemetry packet from the EDU.	VP	
	F-TLM-00410	The FOS shall accept a CCSDS Version-1 format telemetry packet of a predefined type and length.	VP	
	F-TLM-00440	The FOS shall extract from the telemetry packet primary header field the following: a. The 11-bit packet APID. b. The 14-bit packet sequence count. c. The two (2) octet packet length count.	VP	
	F-TLM-00450	The FOS shall be capable of extracting from the telemetry packet application data field the following: a. An optional CCSDS packet secondary header field . b. The packet application process telemetry information.	VP	
	F-TLM-00490	The FOS shall provide the capability to convert the packet time stamp according to a specified spacecraft time code conversion algorithm.	VP	
	F-TLM-00510	The FOS shall support the decommutation of spacecraft housekeeping telemetry for the EOS spacecraft.	VP	
	F-TLM-00515	The FOS shall support the decommutation of instrument housekeeping telemetry for the EOS instruments.	VP	

**Requirement Verification Status (cont.):**

Test Case	L4	Text	REQ Status	NCRs
	F-TLM-00530	The FOS shall decommutate telemetry based upon predefined spacecraft and instrument specific decommutation information.	VP	
	F-TLM-00610	The FOS shall initially mark all defined telemetry parameters as being static and as having no data available.	VPT	ECSed03968*
	F-TLM-10410	The FOS shall accept AM-1 CCSDS format telemetry packets of a predefined type and length.	VP	
	F-TLM-10415	The FOS shall accept AM-1 1664 octet housekeeping telemetry packets.	VP	
	F-TLM-10440	The FOS shall extract from the telemetry packet primary header field the following: a. The 11-bit packet APID. b. The 14-bit packet sequence count. c. The two (2) octet packet length count.	VP	
	F-TLM-10455	The FOS shall be capable of extracting the 1649 octet telemetry information from the 16 Kbps AM-1 housekeeping packet application data field.	VP	
	F-TLM-10490	The FOS shall provide the capability to convert the packet time stamp according to the CCSDS Day Segmented Time Code time conversion algorithm.	VP	
	F-TLM-10525	The FOS shall determine the decommutation algorithm for a telemetered AM-1 CCSDS packet based upon the packet application process identifier (APID) and packet sequence count fields.	VP	

\* = written during the dry-run test phase

**Test Procedure Deviations:** No Deviations from this test case.

**Test Case #/Title:** TLM-2020A Engineering Unit Conversion

**Reference to Test Documentation:** FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:** This test is designed to verify the FOS' capability of providing conversions from raw values to Engineering Units (EU's) for all AM-1 supported real-time telemetry types. The basic demonstration will utilize test mnemonics with conversion curves and telemetry locations modeled after project defined mnemonics.

Following sign-on, alphanumeric telemetry pages which visually associate parameter and associated parameter EU value displays are invoked at the EOC user station. The

telemetry data driver is initiated, broadcasting Housekeeping telemetry onto the FOS LAN in the form of EDUs. As telemetry packets are received and parameter EU conversions are displayed, telemetry displays are snapped. Parameter EU values as shown on alphanumeric displays are analyzed post-test to ensure EU values match the converted raw value when each parameter's database defined calibration coefficient is applied. The above steps are repeated for Health & Safety and Standby telemetry streams.

**Pass/Fail Assessment:**

Pass

**Date of Test:**

19 November 1996; EOC, Building 32, EOC

**Test Conduct Summary:**

EU values for all real-time telemetry types matched conversions for telemetry driver applied raw data, and EU values were displayed via telemetry display pages. Exponential conversions and seventh order polynomials and lower were handled by the system but linear conversions were not.

**NCRs Written:**

ECSe04370

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
TLM-2020A	F-TLM-00525	The FOS shall determine the decommutation algorithm for a telemetered CCSDS packet application data field based upon the packet application process identifier (APID).	VP	
	F-TLM-00530	The FOS shall decommutate telemetry based upon predefined spacecraft and instrument specific decommutation information.	VP	
	F-TLM-00910	The FOS shall allow one predefined EU conversion algorithm to be active for each parameter.	VP	
	F-TLM-00935	The FOS shall be capable of performing EU conversions using seventh order or lower polynomials with a minimum of two coefficients.	VP	
	F-TLM-00945	The FOS shall be capable of performing EU conversions using linear interpolation with no more than 15 pairs of start and end-points that specify 15 contiguous line segments of increasing value.	F	ECSe04370*
	F-TLM-00960	The FOS shall mark accordingly any telemetry parameter that results in an error during the EU conversion process.	UNV	ECSe04370*

**Requirement Verification Status (cont.):**

Test Case	L4	Text	REQ Status	NCRs
	F-TLM-01420	The FOS shall retain the parameter data until replaced by more recent data and/or system reconfiguration.	VP	
	F-TLM-10440	The FOS shall extract from the telemetry packet primary header field the following: a. The 11-bit packet APID. b. The 14-bit packet sequence count. c. The two (2) octet packet length count.	VP	
	F-TLM-10455	The FOS shall be capable of extracting the 1649 octet telemetry information from the 16 Kbps AM-1 housekeeping packet application data field.	VP	
	F-TLM-10465	The FOS shall be capable of extracting the 193 octet telemetry information from the 1 Kbps AM-1 health and safety packet application data field.	VP	
	F-TLM-10490	The FOS shall provide the capability to convert the packet time stamp according to the CCSDS Day Segmented Time Code time conversion algorithm.	VP	
	F-TLM-10525	The FOS shall determine the decommutation algorithm for a telemetered AM-1 CCSDS packet based upon the packet application process identifier (APID) and packet sequence count fields.	VP	
	F-TLM-10955	The FOS shall be capable of performing EU conversions using an exponential function with three coefficients.	VP	

\* = written during the dry-run test phase

**Test Procedure Deviations:**

In all cases , during the test procedure, the user snapped the display pages as many times as possible to get as many samples of the data as possible.

Re-ran Housekeeping data to visually verify mnemonics which were in red limit violations.

**Test Case #/Title:**

TLM-2022A Simultaneous I and Q Channel Data Receipt

**Reference to Test Documentation:** FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:**

This test is designed to verify the FOS' capability of providing telemetry processing of telemetry streams received on the I and Q channels simultaneously. The user will be using a driver called psutil for verification of simultaneous data receipt.

Following sign-on, psutil is brought up in separate terminal windows. One window will monitor the I channel parameter server while the other monitors the Q channel parameter server. The telemetry driver is started on both the I and Q channels and the parameters servers are viewed to ensure simultaneous data receipt.

**Pass/Fail Assessment:**

Pass

**Date of Test:**

13 November 1996; EOC, - Building 32, GSFC

**Test Conduct Summary:**

Data was received on the I and Q channels simultaneously. Telemetry processing on I and Q channels was not degraded as a result of simultaneous telemetry processing. No new NCRs were written during this test.

**NCRs Written:**

None

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
TLM-2022A	F-DMS-00610	The EOC shall provide for operational use of the telemetry PDB definitions.	VP	
	F-TLM-10130	The EOC shall be capable of receiving the 1 kbps AM-1 health and safety telemetry data from both the TDRSS S-band and launch vehicle simultaneously.	VP	

**Test Procedure Deviations:**

Steps were added to get the parameter server port number from the nameserver.

Restarted the test driver because the wrong port numbers were entered the first time.

**Test Case #/Title :**

TLM-2025A      Multi-Byte Parameter Processing

**Reference to Test Documentation:**

FOS Release A Integration & Test Procedures (322-CD-010-003)



**Test Summary:**

This test is designed to verify the ability to decommutate and convert both contiguous and non-contiguous multi-byte parameters.

Following sign-on, alphanumeric telemetry pages which include parameter and associated parameter decom value displays are invoked. The telemetry data driver is initiated, broadcasting values for previously defined multi-byte parameters. As telemetry packets are received and the telemetry information decommutated, telemetry displays are viewed and printed at specified times. Parameter values residing on alphanumeric displays are analyzed post-test to ensure decommutated values match scripted raw values for specified mnemonics.

**Pass/Fail Assessment:**

Pass

**Date of Test:**

22 November 1996; EOC, Building 32, GSFC

**Test Conduct Summary:**

All multi-byte parameters were decommutated as specified and matched data driven values. The database was able to support up to 8 pieces and 64 bits for any single multi-byte parameter but a maximum of 32 bits were decommutated. Multi-byte parameters were not decommutated until the last "piece" of the multi-byte definition was received. There was one new NCR written up on the fact that only 32 bits of any given parameter were decommutated.

**NCRs Written:**

None

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
TLM-2025A	F-TLM-00710	The FOS shall provide for the assembly of parameters from multiple and contiguous bits.	VP	
	F-TLM-00715	The FOS shall provide for the assembly of parameters from multiple and non-contiguous bits.	VP	
	F-TLM-00720	The FOS shall be capable of extracting a maximum of 8 "components" for any one telemetry parameter.	UNV	
	F-TLM-00725	The FOS shall provide a mechanism to collect all components before any subsequent processing can be initiated for telemetry parameters with multiple components.	VP	
	F-TLM-00730	The FOS shall extract all components for a telemetry parameter from the same packet.	VP	
	F-TLM-00735	The FOS shall be capable of extracting a maximum of 32 bits for any one telemetry parameter.	VP	

<b>Test Procedure Deviations:</b>	There were no deviations during this test.
<b>Test Case #/Title:</b>	TLM-2027A          Limits Processing
<b>Reference to Test Documentation:</b>	FOS Release A Integration & Test Procedures (322-CD-010-003)
<b>Test Summary:</b>	<p>This test is designed to verify the ability to report on individual telemetry parameter limit violations according to a given parameter's associated raw/EU limits database definition.</p> <p>Following sign-on and initiation of the I&amp;T database as the operational database and initialization of a real-time string in support of the AM-1 spacecraft, alphanumeric display pages and the real-time events page is invoked. The telemetry data driver is initiated, broadcasting housekeeping telemetry onto the FOS LAN at a rate of 16 kbps. Limit conditions are simulated, ranging from red low limit violation to red high limit violations. Alphanumeric and event pages are snapped at specified periods and compared against scripted limits conditions to determine accuracy of limits reporting.</p>
<b>Pass/Fail Assessment:</b>	Pass
<b>Date of Test:</b>	18 November 1996; EOC, Building 32, GSFC
<b>Test Conduct Summary:</b>	Event messages were generated and displayed for each mnemonic incurring a limit violation or changing violation (i.e. yellow to red/red to yellow) and for those conditions where individual parameter limit violations became nominal. No new NCRs were written for this test case.
<b>NCRs Written:</b>	ECSe04755          ECSe04756

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
TLM-2027A	F-TLM-01010	The FOS shall perform high/low limit checking on parameters when limits have been defined.	VP	
	F-TLM-01015	The FOS shall have the capability to limit check parameters for red high, red low, yellow high, and yellow low boundary violations.	VP	
	F-TLM-01040	The FOS shall limit check telemetry data against its associated limit values for every occurrence of the parameter.	VP	
	F-TLM-01055	The FOS shall mark each telemetry parameter indicating the current limit condition.	VP	
	F-TLM-01110	The FOS shall notify the user when a parameter violates high/low limits.	VP	
	F-TLM-01115	The FOS shall notify the user when a parameter returns to within high/low limits.	VP	
	F-TLM-01125	The FOS limit notification shall contain the current packet spacecraft time stamp, telemetry mnemonic, parameter value, limit condition, and assigned limit values.	VPT	ECSeD04755
	F-TLM-01135	The FOS shall generate a notification without an alarm for limit violations in the yellow range.	VP	
	F-TLM-01140	The FOS shall generate a notification with an alarm for limit violations in the red range.	F	ECSeD04756

**Test Procedure Deviations:**

Checked limits against limits chart and against limit sets as they are defined in the database.

**Test Case #/Title:**

TLM-2030A Telemetry Data Dropout

**Reference to Test Documentation:**

FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:**

This test is designed to verify the ability to mark individual telemetry parameters as "static" when one of two conditions exist: (1) The telemetry stream has not been received for a 5 second period, or (2) data has not been received for any given parameter within a spacecraft master cycle period.

Following sign-on, alphanumeric telemetry pages which visually associate parameter and associated parameter decom values are invoked at EOC user stations. The

telemetry data driver is initiated, broadcasting housekeeping telemetry onto the FOS LAN at a rate of 16 kbps. Data dropout periods are simulated, ranging from one to multiple packets. As telemetry packets are received and EU conversions are displayed, alphanumeric displays are printed. Static indicators associated with each parameter are compared against dropout periods in order to verify timely flagging of static indicators for each parameter.

**Pass/Fail Assessment:** Pass

**Date of Test:** 13 November 1996; EOC, Building 32, GSFC

**Test Conduct Summary:** All telemetry parameters were marked as "static" upon initialization. All parameters were marked as static upon data dropout time-out period (i.e. 5 seconds). Mnemonic not supplied with data values for any time period greater than one master cycle was marked as "static". Event messages were received upon missing packet and missing major cycle conditions. No new NCRs were written for this test case.

**NCRs Written:** None

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
TLM-2030A	F-TLM-00445	The FOS shall generate a notification message whenever a missing packet is detected.	VP	
	F-TLM-00610	The FOS shall initially mark all defined telemetry parameters as being static and as having no data available.	VPT	ECSed03968*
	F-TLM-00620	The FOS shall mark all parameters as static upon data dropout (i.e., no telemetry has been received for 5 seconds).	VP	
	F-TLM-00625	The FOS shall mark a parameter static if the given parameter has not been updated for more than a spacecraft major frame.	VP	
	F-TLM-01430	The FOS shall initialize/baseline all decommutated and converted value areas when no telemetry data is available.	VP	
	F-TLM-10445	The FOS shall generate a notification message whenever a missing AM-1 major cycle is detected.	VP	

\* = NCR written during the dry-run test phase

<b>Test Procedure Deviations:</b>	<p>Ran the telemetry driver a second time to verify that a parameter went to static after it was not updated within the master cycle.</p> <p>Created a Health &amp; Safety frequency file, in /fos/test/am1/scripts/setup, to be used as input into the telemetry driver. This file tells the telemetry driver to send packet 20 once every 3 master cycles.</p>
<b>Test Case #/Title:</b>	TLM-2040A Real-time Graph Display
<b>Reference to Test Documentation:</b>	FOS Release A Integration & Test Procedures (322-CD-010-003)
<b>Test Summary:</b>	<p>This test verifies the ability to display real-time spacecraft and instrument telemetry information via graph display where up to six telemetry parameter values are displayed in Parameter versus Time format.</p> <p>The test begins with the initialization of a real-time logical string, initialization of an EOC user station in support of the real-time string and selection of graph functionality from display builder tool palette options. The graph is created and parameters are chosen to be displayed via the display builder. The telemetry data driver is initialized, broadcasting housekeeping data packets. As graphs are updated with real-time values, the graph is printed at various time intervals and compared to scripted values to ensure data display integrity.</p>
<b>Pass/Fail Assessment:</b>	Partial Pass
<b>Date of Test:</b>	18 November 1996; EOC, Building 32, GSFC
<b>Test Conduct Summary:</b>	<p>Parameter vs. Time graphs were constructed based on user-specified criteria selected from display builder palette options. The user was able to zoom in/zoom out on the graph based on user requests. Several new NCRs were written for this test case. The user is unable to zoom out in steps, the cycle count was incorrect, the graph continues to scroll after the data has stopped, and the axis are not labeled when the user zooms in on the graph. Most requirements failed because of the inability of the user to format the graph. An NCR was previously opened for this problem.</p>
<b>NCRs Written:</b>	<p>ECSed04441            ECSed04723            ECS04724</p> <p>ECSed04767</p>

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
TLM-2040A	F-FUI-07335	The FOS shall allow the user to zoom in on the graph.	VP	
	F-FUI-07340	The FOS shall allow the user to zoom out from the graph.	VP	
	F-FUI-07350	The FOS shall allow the user to select a symbol with which a telemetry parameter is displayed.	F	ECSed04412*
	F-FUI-07355	The FOS shall allow the user to specify whether the graph shall display a grid.	F	ECSed04412*
	F-FUI-07380	The FOS shall allow the user to select the axis granularity.	F	ECSed04412*
	F-FUI-07385	The FOS shall allow the user to select the axis scale labels.	F	ECSed04412*
	F-FUI-07390	The FOS shall allow the user to specify the graph title.	F	ECSed04412*
	F-FUI-07391	The FOS shall allow the user to insert a graph legend.	F	ECSed04412*
	F-FUI-07392	The FOS shall allow the user to save a graph.	VP	
	F-FUI-07398	The FOS shall provide the visual indication that a telemetry value does not exist within the requested time span.	F	ECSed04767

\* = NCR written during the dry-run test phase

**Test Procedure Deviations :** There were no deviations for this test case.

**Test Case #/Title:** TLM-2050A Real-time Telemetry Tables

**Reference to Test Documentation:** FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:** This test verifies the ability to manage and display telemetry tables displaying up to 300 rows of real-time telemetry values.

The test begins with the selection of the table function from a predefined dynamic page. The mnemonics are chosen and saved from menu options. Once mnemonics are selected, the telemetry data driver is initialized, broadcasting housekeeping data packets. As tables are updated with real-time values, they are printed at various time intervals. Via post-analysis, table values are compared with scripted telemetry values to ensure data integrity and accurate representation of telemetry Decom/EU values, as well as specified information residing on the table displays.

**Pass/Fail Assessment:** Partial Pass

**Date of Test:**

14 November 1996; EOC - GSFC Building 32

**Test Conduct Summary:**

The user was able to successfully build and display a telemetry table. Table information was accurate, including correct UTC times and EU values for displayed mnemonics. While selecting parameters, the user is unable to select groups of mnemonics. Also, during the build process, the table moves around in the window. The one major piece of functionality that was written up had to do with parameter values. The values were correct but did not match the sequence counts. Requirements for this test case were partially verified.

**NCRs Written:**

ECSed04766

ECSed04743

ECSed04649

ECSed4648

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
TLM-2050A	F-FOS-00025	The EOC shall use Ecom for flight operations data transfers.	UNV	ECSed04743
	F-FUI-07410	The FOS shall allow the real-time table display to have a maximum of 300 rows of data. Once the maximum has been reached, the oldest rows are removed as newer rows are added.	VPT	ECSed04766
	F-TLM-01410	The FOS shall make available the values for every predefined telemetry parameter.	VPT	ECSed04649

**Test Procedure Deviations :**

Skipped step 8 because there is a workaround to make dynamic pages active. The station was brought down and back up and this step was executed at that point.

Selected two parameters at random to ensure that the user would be able to select multiple parameters at the same time.

**Test Case #/Title:**

TLM-2080A

Real-time Telemetry Archive

**Reference to Test Documentation:** FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary:**

This test is designed to verify the ability to archive real-time telemetry including health & safety, standby, and housekeeping packets. A secondary objective is to verify

simultaneous archiving of I and Q channel housekeeping packets as well as providing a unique archive file naming convention for incoming data.

The test begins with the startup of RTS and user station default processes. The telemetry driver is initiated and telemetry pages are displayed. Following several minutes of archiving, another telemetry format is broadcast. This continues until all real-time telemetry formats are archived. The test continues with the broadcast of housekeeping telemetry over both the I and Q channels. The archive catalog is displayed and its content viewed in order to verify accurate telemetry file naming conventions.

**Pass/Fail Assessment:**

Pass

**Date of Test:**

14 November 1996; EOC, Building 32, GSFC

**Test Conduct Summary:**

All real-time telemetry archive files, except for Standby and Health & Safety Q channel data, were generated during archive-enabled periods. An NCR was written up for these two data types. Each archive file name was appended with the UTC time of the first generated packet. Packets were archived in chronological order.

**NCRs Written:**

ECSed04665

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
TLM-2080A	F-DMS-00710	The EOC shall archive all telemetry data.	VPT	ECSed04665
	F-DMS-01010	The EOC shall be capable of storing data files.	VP	

**Test Procedure Deviations :**

Standby and Health & Safety Q channel data were not archived. The test was restarted at step 13.

**3.3.2.10 Telemetry History Thread Tests**

The following section presents the detailed result information for tests ANA-2000A (Telemetry History Request & Dataset Generation), ANA-2020A (User Specified Statistics Request & Dataset Generation) and ANA-2070A (Analysis Request Management).



**Test Case #/Title:** ANA-2000A Telemetry History Request and Dataset Generation

**Reference to Test Documentation:** FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Summary :** This test is designed to verify the ability to build a telemetry history request via the combination of user interface and analysis tool options and automatically generate a dataset of matching archived telemetry data based on selected analysis options (i.e. telemetry parameter names, start/stop time intervals, sampling rates, etc.). The test begins with the initialization of the EOC. The Analysis Request tool is invoked and a historical request is generated, with selected options including request name, start/stop time interval, parameter names, and sampling rates. The request is saved, and then submitted for dataset generation based on the menu options previously submitted. ASCII printouts are generated and analyzed post-test to ensure dataset accuracy and integrity. The last portion of the test deals with the selection of menu options causing error conditions (i.e. mnemonics not matching operational database, attempting to save statistics request without sufficient information, etc.). Following the completion of each invalid request, the request is submitted for dataset generation.

**Pass/Fail Assessment:** Pass

**Date of Test:** 20 November 1996; EOC - GSFC Building 32

**Test Conduct Summary:** All of the user interface menus supporting telemetry history include the proper fields (parameter name, data type, start/stop time intervals, and data quality information). It was determined, via post-test analysis, that the telemetry history reports generated match the users request and the data was not compromised in any way through the retrieval and generation process. All illegal entries, with the exception of mnemonics, resulted in an error message and disallowed dataset generation. Illegal mnemonics were left out of the dataset generation. Two new NCRs were written during this test. The analysis windows all closed down when the user tried to

select a time and the analysis event messages need to be more descriptive. If there is an error during the request, the event messages currently in the system do not give enough information to diagnose the problem.

**NCRs Written:**

ECSed04718      ECSed04413      ECSed04746  
ECSed04751      ECSed04748      ECSed04739

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
ANA-2000A	F-ANA-01010	The FOS shall be able to access all archived telemetry data for analysis.	VPT	ECSed04413
	F-ANA-03010	The FOS shall be able to perform analysis on all telemetry parameters contained within the telemetry archive.	VPT	ECSed04413
	F-ANA-03135	The FOS shall provide the capability to uniquely time tag parameters to the granularity of 1 milliseconds.	VP	
	F-ANA-04010	The FOS shall build a dataset in response to a request for data analysis.	VP	
	F-ANA-04060	A dataset shall not be limited in size, except as limited by the amount of storage available.	UNV	ECSed04746
	F-ANA-04070	The FOS shall provide the capability to generate datasets which include any combination of one or more telemetry mnemonics for a single specified mission.	VP	
	F-ANA-04080	The FOS shall provide the requested EU and/or raw value for each occurrence of each specified telemetry mnemonic in the dataset.	VP	
	F-ANA-04090	The FOS shall provide the spacecraft time for each telemetry mnemonic in the dataset.	F	ECSed04751
	F-ANA-04100	The FOS shall provide the capability to generate datasets based on spacecraft start and stop times as specified in the request.	VP	
	F-ANA-04110	The FOS shall provide the capability to generate datasets which contain telemetry values based on user specified sampling rate specified per parameter.	VP	

### Requirement Verification Status (cont.):

Test Case	L4	Text	REQ Status	NCRs
	F-ANA-04130	The FOS shall provide the capability to include the following information for each sampling in a dataset: a. Raw value b. EU converted value (if applicable) c. Quality status indicator d. Out-of-limits low indicator e. Out-of-limits high indicator f. Delta limit error indicator g. Conversion error indicator h. Invalid mnemonic indicator	VP	
	F-FUI-09100	The FOS shall provide the capability to build an off-line analysis request that contains the following: a. spacecraft Id b. spacecraft subsystems c. telemetry parameters d. time period e. sampling rates f. data filters g. frequency intervals h. output views i. output view formats j. pre-defined algorithms k. request name	VPT	ECSed04449*
	F-FUI-09105	The FOS shall provide the capability to select a sampling rate per selected telemetry parameter when building an analysis request for historical data analysis. Sampling rates shall be one of the following: a. all data b. changes only c. every Nth sample when N = a specified number	VP	
	F-FUI-09120	The FOS shall provide the capability to modify a stored analysis request and resubmit it as a new request.	VP	
	F-FUI-09125	The FOS shall provide the capability for a user to save an analysis request.	VP	
	F-FUI-09130	The FOS shall provide the capability for a user to delete a stored analysis request.	VP	
	F-FUI-09170	The FOS shall provide the capability to display an analysis request.	VP	

\* = NCR Written during dry-run test phase

<b>Test Procedure Deviations :</b>	<p>In step 12, used CDH_N instead of COM_N when filtering data.</p> <p>When trying to select a time for the analysis request, all windows associated with the analysis request closed. Started the request over again and skipped the error condition steps 18 and 19.</p> <p>The start time was entered incorrectly. The request had to be started over again. There is an NCR in the system stating that the user is unable to edit a request and delete the time.</p> <p>The carry-out format, from the ICD-106, will be added to the test procedure.</p>
<b>Test Case #/Title :</b>	ANA-2020A User-specified Statistics Request and Dataset Generation
<b>Reference to Test Documentation :</b>	FOS Release A Integration & Test Procedures (322-CD-010-003)
<b>Test Summary :</b>	<p>This test is designed to verify the ability to build a user-specified statistics request via the combination of user interface and analysis tool options and automatically generate a dataset of matching statistics based on archived telemetry data associated with the user request. The test begins with the initialization of the EOC. The Analysis Request tool is invoked and a user-specified statistics request is generated, with selected options including request name, parameter names, start/stop time, and statistics interval times. The request is saved, and then submitted for dataset generation based on the menu options previously submitted. ASCII printouts are generated and analyzed post-test to ensure dataset accuracy and integrity. The last portion of the test deals with the selection of menu options causing error conditions (i.e. attempting statistical computations on data not residing in the archive, etc.). Following the completion of each invalid request, the request is submitted for dataset generation.</p>
<b>Pass/Fail Assessment :</b>	Pass
<b>Date of Test :</b>	22 November 1996; EOC - GSFC Building 32

**Test Conduct Summary :**

All user interface menus supporting user-specified statistics included the proper fields (request name, parameter names, start/stop times, and statistic interval time). It was determined, via post-test analysis, that the user request matched the associated dataset content. Statistic computation was accurate and based on the start/stop time interval supplied by the user. The number of samples listed for each statistical computation matched the number of samples available in the selected start/stop time. Data archive integrity was not compromised during dataset generation. Illegal options disallowed dataset generation and resulted in error messages. Two new NCRs were written during this test. The first was for the user's inability to submit a one second request. The second was a performance NCR. The analysis request was not started within five seconds of receipt.

**NCRs Written:**

ECSed04729

ECSed04731

ECSed04732

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
ANA-2020A	F-ANA-01020	The FOS shall be able to access all user generated MMM statistics data files for analysis.	VP	
	F-ANA-03015	The time span for the analysis shall be one second or greater.	VPT	ECSed04729
	F-ANA-03020	The FOS shall verify that for user supplied start and stop times, the stop time is greater than the start time.	VP	
	F-ANA-03030	The FOS shall notify the user of any mnemonic that has been requested for analysis and is found to be invalid for the specified mission.	VP	
	F-ANA-03040	The FOS shall provide notification for every telemetry mnemonic requested for analysis which is not valid for the time interval requested.	F	ECSed04439
	F-ANA-03050	The FOS shall perform analysis on all requested telemetry parameters which have at least one sampling within the specified time interval.	VP	
	F-ANA-03070	The FOS shall by default use data flagged as good quality in routine analysis.	F	ECSed03901
	F-ANA-03080	The FOS shall allow the user to request the use of data with questionable quality in routine analysis.	VP	

**Requirement Verification Status (cont.):**

Test Case	L4	Text	REQ Status	NCRs
	F-ANA-05210	The FOS shall provide the capability to generate the following statistics for each telemetry parameter specified in the request: a. Minimum value b. Spacecraft time for the minimum value c. Maximum value d. Spacecraft time for the maximum value e. Mean value f. Standard deviation g. Number of samples	VP	
	F-ANA-05220	The FOS shall provide the capability to compute the statistics for a user defined interval of greater than or equal to one second and less than or equal to one day.	VP	
	F-ANA-05250	The FOS shall compute statistics for a given parameter if the telemetry item is updated within that interval.	VP	
	F-DMS-00770	The FOS shall provide the capability to retrieve archived telemetry by specifying the following: a. Spacecraft start time b. Spacecraft stop time c. Data source (Ground station) d. Data type (housekeeping, engineering) e. Spacecraft Identifier (if applicable)	VPT	ECSe04449
	F-DMS-00790	The EOC shall initiate processing of off-line telemetry data from the EOC archive within 5 seconds upon receipt of a telemetry request.	F	ECSe04731
	F-DMS-01010	The EOC shall be capable of storing data files.	VP	
	F-DMS-01020	The EOC shall be capable of retrieving data files.	VP	
	F-FUI-09110	The FOS shall provide the capability to select statistical data per selected TLM parameter when building an analysis request for historical data analysis. Statistics shall be one of the following: a. system generated b. min-max reduced, with a specified interval in minutes	VP	
	F-FUI-09120	The FOS shall provide the capability to modify a stored analysis request and resubmit it as a new request.	VP	

<b>Test Procedure Deviations:</b>	<p>Click the mouse on good data only in step 6h. Step 6m1 was changed to manually search for parameters. There is an NCR on the Find function which does not work.</p> <p>Steps were added at the end of the procedure to test the error condition of having a start time greater than the stop time and to have a one second request.</p>
<b>Test Case #/Title :</b>	ANA-2070A Analysis Request Management
<b>Reference to Test Documentation:</b>	FOS Release A Integration & Test Procedures (322-CD-010-003)
<b>Test Summary :</b>	<p>This test is designed to verify the ability to manage all requests for data analysis. This includes simultaneous processing of multiple requests as well as a queue of requests waiting to be processed. This test will also verify selection filter capabilities and user-specified statistics report content. The test begins with the initialization of the EOC. The Analysis Request tool is invoked and a historical request is generated, with selected options including request name, start/stop time interval, parameter names, and sampling rates. During the mnemonic selection portion of the request, all selection filter capabilities are verified. Several other analysis requests are generated in order to fill the queue. The queue is checked to ensure the accuracy of the status of each request submitted. At least one of the requests will be a user-specified statistics request. After this request has completed, the ASCII report file is generated and checked. This file should be checked for correct header information as well as data accuracy.</p>
<b>Pass/Fail Assessment :</b>	Partial Pass
<b>Date of Test:</b>	21 November 1996; EOC - GSFC Building 32
<b>Test Conduct Summary:</b>	<p>The queue was able to hold 10 requests. Each request displayed the request name, a status, and percentage complete. While selecting a parameter for analysis, the user was able to filter according to spacecraft IDs, subsystems, instruments, and ground systems. The user was able to select one or more instruments and spacecraft for each spacecraft as a filter criteria. The user was provided with the capability to generate an ASCII report from a user-specified statistics request. The statistics report contained header information consisting of a date and time of the report, a spacecraft start and stop time,</p>

and an interval type for the statistic. For each parameter, the statistics report contained a mnemonic name, minimum value, maximum value, mean value, standard deviation, number of samples, and spacecraft time for the minimum and maximum values. Several new NCRs were written for this test case. The event messages, for analysis, were not thorough, old datasets were overwritten without prompting the user, the user did not receive an event message for parameters not in the time range, and the Statistics report contained errors.

**NCRs Written:**

ECSed04749

ECSed04730

ECSed04750

ECSed04751

ECSed04457

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
ANA-2070A	F-ANA-04315	The FOS shall provide the capability to build ASCII reports from the user specified telemetry MMM statistics data.	VP	
	F-ANA-04320	Each statistics report shall contain the following header information: a. The date and time of the report b. The starting spacecraft time of the data c. The ending spacecraft time of the data d. The interval type of the MMM statistics (if applicable)	VPT	ECSed04451
	F-ANA-04330	The FOS shall provide the mnemonic name for each telemetry item specified in a statistics report.	VP	
	F-ANA-04340	The FOS shall provide the capability to include the following information for each telemetry item specified as part of the telemetry statistics report: a. Minimum value within each time interval b. Spacecraft time for each minimum value reported c. Maximum value within each time interval d. Spacecraft time for each maximum value reported e. Mean value for each time interval f. Standard deviation g. Number of samples occurring within each time interval	VP	
	F-ANA-08010	The FOS shall provide the capability to process up to TBD simultaneous requests for data analysis	VPT	ECSed04455
	F-ANA-08020	The FOS shall provide the capability to maintain a queue of up to 10 requests for data analysis.	VP	



**Requirement Verification Status (cont.):**

Test Case	L4	Text	REQ Status	NCRs
	F-ANA-08030	The FOS shall provide the capability to delete a request from the queue.	F	ECSe04750
	F-ANA-08040	The FOS shall provide the capability to estimate the percentage complete of a data analysis request.	F	ECSe04749
	F-ANA-08050	The FOS shall provide the capability to report the status of a data analysis request. The status can be one of the following: a. Request submitted b. Request waiting in queue c. Request currently being processed d. Request complete	F	ECSe04749
	F-FUI-03200	The FOS shall provide a utility that allows a user to filter items according to any of the following: a. spacecraft b. spacecraft subsystem c. instrument d. ground system	VP	
	F-FUI-03205	The FOS shall allow the user to specify one or more spacecraft Ids as a filter criteria.	VPT	ECSe04751
	F-FUI-03215	The FOS shall allow the user to specify one or more instruments as a filter criteria.	VPT	ECSe04751
	F-FUI-03220	The FOS shall allow the user to specify one or more ground systems as a filter criteria.	VPT	ECSe04751
	F-FUI-03225	The FOS shall allow the user to specify one or more subsystems associated with a spacecraft Id as a filter criteria.	VP	
	F-FUI-03230	The FOS shall allow the user to specify one or more instruments associated with a spacecraft Id as a filter criteria.	VP	

**Test Procedure Deviations:**

The test was restarted because the request times were incorrect.

The test was restarted because several requests were hung in the queue and several others were deleted from the queue.

**3.3.2.11 Hardware Thread Test**

The following section presents the detailed result information for EOC hardware test HRD-2000A.

**Test Case Number:**

HRD-2000A EOC Hardware

<b>Test Summary:</b>	This test was designed to verify that the FOS hardware components located at the EOC met the performance and standards specified by the aggregate set of hardware requirements.
<b>Reference to Test Documentation:</b>	FOS Release A Integration & Test Procedures (322-CD-010-003)
<b>Pass/Fail Assessment:</b>	Pass
<b>Date of Test:</b>	11 November 1996; EOC - GSFC Building 32
<b>Test Conduct Summary:</b>	<p>This test successfully verified that the FOS hardware components located at the EOC met the performance and standards specified by the aggregate set of hardware requirements. In most cases, inspection of hardware documentation (i.e hardware specifications, drawings, etc.) was used to verify the hardware requirements. When documentation was lacking, verification was performed via demonstration. The majority of the objectives were satisfied. Partially satisfied objectives include: cabinet shall provide removable side panels and rear doors (F-HRD-00085 &amp; F-HRD-02090), each User Station shall provide one color text and graphics display (F-HRD-01015), the following RAID components shall be Hot Swappable (F-HRD-03035), the EOC shall be designed with system test features (F-HRD-06010). Unsatisfied objectives include: the Data Server processors shall be physically and functionally identical (F-HRD-02005), the cabinet shall provide a minimum of 48 vertical Units (F-HRD-02075), the RAID shall be network attached or hosted to a minimum of 2 front end processors (F-HRD-03040), the RAID shall have a transfer rate of 20Mbps(F-HRD-03045), the time reference for each network time server shall be a GFE NASA-36 bit serial time code signal (F-HRD-05010). Partially satisfied and unsatisfied objectives resulted in no major impacts to the test.</p>
<b>NCRs Written:</b>	ECSed04754            ECSed04388 ECSed04395

**Requirement Verification Status:**

Test Case	L4	Text	REQ Status	NCRs
HRD-2000A	F-FOS-00450	The EOC LAN shall be able to perform filtering based on network address to control access for external and internal interfaces.	VP	
	F-FOS-00455	The EOC LAN shall be able to perform filtering based on TCP socket number to control access for external and internal interfaces.	VP	
	F-FOS-00460	The EOC LAN shall be able to perform filtering based on protocol to control access for external and internal interfaces.	VP	
	F-HRD-00010	The Real-time Server shall include a CRT to be used as the local systems operations console.	VP	
	F-HRD-00015	The Real-time Server shall be upgradeable/expandable with additional quantities and types of peripherals.	VP	
	F-HRD-00020	The Real-time Server shall be upgradeable/replaceable within the same product family without the need for any perturbation of any software or replacement of any peripheral or attached component.	VP	
	F-HRD-00025	At a minimum, the Real-time Server processor shall meet the following capacity and functional requirements: a. POSIX compliant IEEE 1003.1 operating system (UNIX). b. POSIX compliant IEEE 1003.4 real-time extension c. Shall support 2 FDDI interface cards.	VP	
	F-HRD-00030	Real-time Server disk drives shall provide a minimum of 4 gigabytes and shall be upgradeable to 8 gigabytes.	VP	
	F-HRD-00035	All disk drives serving a specific function (e.g. system and applications software, or data storage) shall be identical and will have equal capacity.	VP	
	F-HRD-00040	Each Real-time Server shall support one tape drive.	VP	
	F-HRD-00045	Each Real-time Server tape drive shall have the following characteristics: a. 4mm Digital Audio Tape (DAT) format b. Accept industry standard magnetic 4mm DAT (i.e. DDS-90) c. Data transfer rate of 400KB/sec	VP	

**Requirement Verification Status (cont.):**

Test Case	L4	Text	REQ Status	NCRs
	F-HRD-00050	The Real-Time Server tape drives shall be upgradeable/replaceable within the same product family.	VP	
	F-HRD-00055	Each Real-Time Server shall support one CD-ROM drive.	VP	
	F-HRD-00060	Each Real-Time Server CD-ROM drive shall have the following characteristics: a. Accept 600MB Compact Disk	VP	
	F-HRD-00065	The cabinet shall provide a RETMA standard 19 inches of equipment mounting width.	VP	
	F-HRD-00070	The cabinet shall be a minimum of 54" and a maximum of 72" tall, with standard 19" rack mounts.	VP	
	F-HRD-00075	The cabinet shall provide a minimum of 24 inches of equipment mounting depth.	VP	
	F-HRD-00085	The cabinet shall provide removable side panels and rear door.	VPT	ECSed04460
	F-HRD-00090	The cabinet shall provide earth continuity for all components within.	VP	
	F-HRD-00095	The cabinet shall provide sufficient equipment ventilation.	VP	
	F-HRD-00100	The cabinet shall supply a minimum of one power controller.	VP	
	F-HRD-01005	At a minimum, each processor shall meet the following capacity and functional requirements: a. POSIX compliant IEEE 1003.1 operating system (UNIX) b. Support AUI 802.3 ethernet connection. c. Support 2GB internal disk.	VP	
	F-HRD-01010	Each User Station shall provide one QWERTY keyboard which shall: a. Be detachable and cabled for movement on a desk-top style workstation area b. Provide a minimum of 12 programmable function keys	VP	

**Requirement Verification Status (cont.):**

Test Case	L4	Text	REQ Status	NCRs
	F-HRD-01015	Each User Station shall provide one color text and graphics display device which shall: a. Display the complete ASCII character set b. Provide a minimum of 1024 pixel x 864 lines resolution display c. Display a minimum of 16 colors d. Display pages 24 lines by 80 characters wide e. Display a minimum of four screen display pages f. Display pages readable from any location along the width of the workstation and up to a distance of 6 feet from the screen g. Provide a minimum of 19 inches diagonal non-glare screen h. Provide RGB video output for hard copy i. Feature an integral swivel/tilt base j. Provide brightness, contrast and power controls within easy reach. k. Be physically relocatable within the operations center	VPT	ECSed03468
	F-HRD-01020	The User Station shall provide one cursor pointing device (mouse)	VP	
	F-HRD-01025	The User Station shall be upgradeable/replaceable within the same product family.	VP	
	F-HRD-01030	The video hardcopy device shall provide a minimum of 16 colors.	VP	
	F-HRD-01035	The video hardcopy device shall be physically relocatable within the EOC.	VP	
	F-HRD-01040	The video hardcopy device shall be capable of printing 2 pages per minute.	VP	
	F-HRD-01045	The video hardcopy device shall be controlled from a remote control.	VP	
	F-HRD-02005	The Data Server processors shall be physically and functionally identical in supporting the FOS processing requirements.	F	ECSed04459
	F-HRD-02010	Each Data Server shall include a CRT or window to be used as the local systems operations console.	VP	
	F-HRD-02015	Each Data Server shall be upgradeable/expandable with additional quantities and types of peripherals.	VP	

**Requirement Verification Status (cont.):**

Test Case	L4	Text	REQ Status	NCRs
	F-HRD-02020	Each Data Server shall be upgradeable/replaceable within the same product family without the need for any perturbation of any software or replacement of any peripheral or attached component.	VP	
	F-HRD-02025	At a minimum, each Data Server processor shall meet the following capacity and functional requirements: a. POSIX compliant IEEE 1003.1 Operating System (UNIX) b. Shall support 2 FDDI interface cards.	VP	
	F-HRD-02030	Data Server disk drives shall provide a minimum of 4 gigabytes and shall be upgradeable to 8 gigabytes.	VP	
	F-HRD-02035	All drives serving a specific function (e.g. system and applications software, or data storage) shall be identical and will have equal capacity.	VP	
	F-HRD-02040	Each Data Server shall support one tape drive.	VP	
	F-HRD-02045	Each Data Server tape drive shall have the following characteristics: a. 4mm Digital Audio Tape format b. Accept industry standard magnetic 4mm DAT (i.e. DDS-90) c. Data transfer rate of 400KB/sec	VP	
	F-HRD-02050	The Data Server tape drives shall be upgradeable/replaceable within the same product family.	VP	
	F-HRD-02070	The cabinet shall provide a RETMA standard 19 inches of equipment mounting width.	VP	
	F-HRD-02075	The cabinet shall provide a minimum of 48 vertical Units (1 Unit = 1.75") of equipment mounting height.	F	ECSed03466
	F-HRD-02080	The cabinet shall provide a minimum of 24 inches of equipment mounting depth.	VP	
	F-HRD-02090	The cabinet shall provide removable side panels and rear door.	VPT	ECSed04460
	F-HRD-02095	The cabinet shall provide earth continuity for all components within.	VP	
	F-HRD-02100	The cabinet shall provide sufficient equipment ventilation.	VP	
	F-HRD-02105	The cabinet shall supply a minimum of one power controller.	VP	

**Requirement Verification Status (cont.):**

Test Case	L4	Text	REQ Status	NCRs
	F-HRD-03005	Shall be compatible with POSIX compliant operating systems.	VP	
	F-HRD-03010	Shall be accessible from servers and workstations on the network.	VP	
	F-HRD-03020	All RAID drives shall be identical and have equal capacity.	VP	
	F-HRD-03025	RAID shall support RAID level-5: striping with interleaved parity.	VP	
	F-HRD-03030	Disks shall be Hot Swappable.	VP	
	F-HRD-03035	The following components shall be Hot Swappable: power supplies, fans, disk-array controllers	VPT	ECSed03472
	F-HRD-03040	The RAID unit shall be network attached or hosted to a minimum of 2 front-end processors.	F	ECSed04395
	F-HRD-03045	The RAID unit shall have a data transfer rate of 20MB per second.	F	ECSed03471
	F-HRD-04015	The printers shall be capable of printing 8 pages per minute.	VP	
	F-HRD-04025	Each logging printer shall be capable of printing a minimum of 1200 lines per minute.	VP	
	F-HRD-04030	The printer shall support continuous feed paper.	VP	
	F-HRD-05005	There shall be a minimum of two network time servers located at the EOC.	VP	
	F-HRD-05010	The time reference for each network time server shall be a GFE NASA-36 bit serial time code signal.	UNV	ECSed04754
	F-HRD-05015	The time server shall support the network time protocol (NTP).	VP	
	F-HRD-06005	The local area network shall support 100Mbps bandwidth and 10 Mbps baseband (different segments) as described by the IEEE 802.3 standard, and shall provide: a. Data Integrity - The network shall check for transmission errors. b. Redundancy - Redundant connectivity shall prevent a single point of failure. c. Expandability - The network must be able to support up to 100 connections.	VP	

**Requirement Verification Status (cont.):**

Test Case	L4	Text	REQ Status	NCRs
	F-HRD-06010	The EOC shall be designed with system test features to enable checkout and test with minimum impact on operations, including test points, "T" connections, break-out boxes, and permanently installed test equipment.	VPT	ECSed04388
	F-HRD-07017	The EOC shall provide one Data Storage Unit supporting RAID level 5.	VP	
	F-HRD-07020	The EOC shall provide a redundant Local Area Network.	VP	
	F-HRD-07025	All EOC workstations and processors shall be capable of operating simultaneously and independently.	VP	

**Test Procedure Deviations:** None

**3.3.2.12 Post-Patch Confidence Tests**

The following section presents the detailed result information for post patch confidence test CON-2000A.

**Test Case Number and Title:** CON-2000A Post-Patch Confidence Test

**Reference to Test Documentation:** FOS Release A Integration & Test Procedures (322-CD-010-003)

**Test Objectives:** This test is designed to verify critical FOS functionality after system re-delivery or after a patch has been incorporated into the FOS test environment. The test provided a reasonable level of confidence that the re-delivery of the associated patch did not adversely impact FOS functionality. Fundamental planning & scheduling, command, telemetry, and analysis services were confirmed prior to executing the more detailed FOS thread test procedures developed for each subsystem.

**Pass/Fail Assessment:** 1st run: Pass

2d run: Pass

**Date of Test:** 1st run: 11 November 1996; EOC - GSFC Building 32

2d run: 19 November 1996; EOC - GSFC Building 32



<b>Test Conduct Summary:</b>	This test successfully demonstrated that FOS provides the following functionality: Telemetry Processing, Activity Definition, Activity Scheduling, DAS / ATC / Ground Schedule Generation, Ground Script Execution, and an Analysis Request.		
<b>NCRs Written:</b>	ECSed04719	ECSed04711	ECSed04663
<b>Requirement Verification Status:</b>	No RBR requirements or L4 requirements are mapped to test case CON-2000A.		
<b>Test Procedure Deviations:</b>	<p>1st run:</p> <p>Due to software problems in the command procedure and submnemonic check areas, did not run the Manual Real-time Commanding portion of the test.</p> <p>2d run:</p> <p>Since telemetry was being processed as part of another test, did not execute the Telemetry Processing Sub-procedure.</p> <p>Due to known software problems in the command procedure area, did not run the Manual Real-time Commanding portion of the test.</p>		

### 3.3.2.13 End-to-End Tests

The following section presents the detailed result information for end to end tests INT-2000A, INT-2010A, and INT-2020A.

<b>Test Case Number and Title:</b>	INT-2000A End-to-End Test #1: Housekeeping Telemetry Processing; Activity Definition and Scheduling; Command Procedure Building
<b>Reference to Test Documentation:</b>	FOS Release A Integration & Test Procedures (322-CD-010-003)
<b>Test Summary:</b>	This test procedure is designed to demonstrate the EOS Operations Center (EOC) capabilities in an operational manner, with multiple User Stations executing concurrent functionality. This is the first integrated test procedure in a series of three. This test procedure will demonstrate and verify functions of Planning and Scheduling, by defining and scheduling activities; Resource Management, by creating and viewing logical strings; and Telemetry, by capturing, processing and archiving simulated housekeeping telemetry data.

**Pass/Fail Assessment:**

Pass

**Date of Test:**

21 November 1996; EOC - GSFC Building 32

**Test Conduct Summary:**

This test procedure verified that FOS successfully accomplishes the following: creates logical strings and activity definitions; schedules activities; receives simulated real-time housekeeping telemetry data; decommutates telemetry data values and converts them to engineering units (EU), flags them for limits violations, and displays telemetry values.

Real interfaces (EDOS and EBnet) were not used in this test. IST functionality was emulated using an EOC workstation.

**NCRs Written:**

ECSed04743

ECSed04742

ECSed04744

**Requirement Verification Status:**

Only RBR requirements, not L4 requirements, are mapped to test case INT-2000A as follows:

Test Case	RBR	Text	Interpretation	Clarification	Pass /Fail
INT-2000A	AM1-0050#A	The AM-1 spacecraft shall have the capability to send (in CADU format) and the EOC shall have the capability to receive (in EDUs containing CCSDS telemetry packets and CLCWs) real time AM-1 spacecraft and instrument housekeeping telemetry packets (as defined in AM-1 ICD 106) via EDOS/EBnet and the SN, GN, DSN, or WOTS interfaces.	A: SN Only.		VP

Test Case	RBR	Text	Interpretation	Clarification	Pass /Fail
	EOC-2030#A	The EOC shall store and maintain EOS planning and scheduling information, which includes, at a minimum, the following: a. IWG science guidelines, as specified in the LTSP and LTIP b. Long-term spacecraft operations plan c. Predicted availability of the spacecraft resources d. Baseline activity profile for each applicable instrument e. Planning and scheduling information received from the FDF f. Preliminary resource schedules, including TDRSS contact times g. Detailed activity schedules, including TDRSS contact times	A: Basic functionality provided. Scheduled activities (including activity modes and resource usage), BAP definitions, and activity definitions.		VP
	EOC-5010#A	The EOC shall receive from EDOS the following telemetry data types in CCSDS packets containing: a. Real-time spacecraft and instrument housekeeping data b. Spacecraft recorder housekeeping data c. SCC memory dump data	A: RT HK data.		VP
	EOC-5070#A	The EOC shall provide the capability to detect and report gaps in the telemetry data it receives.			VPT
	EOC-5080#A	The EOC shall provide the capability to decommutate spacecraft and instrument housekeeping data.			VPT

Test Case	RBR	Text	Interpretation	Clarification	Pass /Fail
	EOC-5090#A	The EOC shall perform the necessary engineering unit conversion on the decommutated housekeeping data.			VPT
	EOC-5100#A	The EOC shall provide the capability to perform limit checking on all non discrete parameters within the real-time telemetry, flagging all parameters that have limit violations.			VPT
	EOC-5110#A	The EOC shall provide the capability to generate an event message whenever a predetermined number of limit violations for a parameter is detected.			VPT
	EOSD0010#A	ECS shall use and support the Space Network (SN), via the EDOS/EBnet interface, to obtain the forward and return link data communications needed to achieve full end-to-end ECS functionality.	A: ONLY THE GSFC AND LARC DAACS WILL INTERFACE WITH EDOS		VP
	EOSD0020#A	ECS shall use and support the EDOS/EBnet interface to obtain the data capture, data archival, and data distribution services needed to achieve full end-to-end ECS functionality.			VP
	EOSD1605#A	ECS elements shall receive from EDOS telemetry data, including housekeeping, engineering, ancillary, and science data from EOS instruments and spacecraft.			VP

Test Case	RBR	Text	Interpretation	Clarification	Pass /Fail
	ICC-2115#A	The ICC shall have the capability to plan and schedule instrument maintenance activities.	A: Basic functionality provided		VP
	ICC-3100#A	The ICC shall be able to generate, validate, and store preplanned contingency instrument commands to support specific TOO observations.	A: Basic functionality provided.		VPT
	ICC-4010#A	Upon request from the PI/TL, the ICC shall provide the IST with at a minimum the following: a. Instrument housekeeping and engineering data b. Spacecraft housekeeping data			VP
	ICC-4020#A	The ICC shall provide the capability to accept CCSDS packets from EDOS containing at a minimum the following data types: a. Spacecraft and instrument housekeeping data b. Instrument engineering data or instrument science data within which instrument engineering data is embedded c. Instrument memory dump data	A: AM-1 only.		VP
	ICC-4045#A	The ICC shall provide the capability to extract instrument housekeeping data and relevant spacecraft parameters from the spacecraft and instrument housekeeping data stream.			VPT
	ICC-4090#A	The ICC shall provide the capability to detect and report gaps in the telemetry data it receives.			VPT

Test Case	RBR	Text	Interpretation	Clarification	Pass /Fail
	ICC-4150#A	The ICC shall have the capability to provide event messages whenever a predetermined number of limit violations for a parameter is detected.			VPT
	ICC-4560#A	The ICC shall maintain a record of the instrument configuration, including the state of instrument subsystems.			VPT
	NI-0030#A	ECS shall have the capability to interface with the TDRSS for obtaining return link (telemetry) data from EOS spacecraft (via the EDOS/EBnet interface). Mission-specific requirements for supporting EOS spacecraft telemetry operations will be documented in the EOS mission Detailed Mission Requirements documents.			VP

**Test Procedure Deviations:**

Encountered several initialization, configuration, and operator errors upon system startup as the system was not properly brought down following testing on the previous day. Once the system was properly initialized and configured, the test ran successfully.

Since the Telemetry Header and Telemetry Decom display pages had already been built and made available, these display pages were not rebuilt during this test (INT-2000A).

**Test Case Number and Title:**

INT-2010A End-to-End Test #2: Health & Safety Telemetry Processing; DAS/ATC/Ground Schedule Generation; Analysis Request Processing

**Reference to Test Documentation:**

FOS Release A Integration & Test Procedures (322-CD-010-003)

<b>Test Summary:</b>	This test procedure builds upon Integrated Test Procedure 1 and executes several FOS capabilities concurrently to simulate the operational environment. The test procedure verifies and demonstrates functions of Planning and Scheduling, by generating a Detailed Activity Schedule (DAS); Command Management, by generating a Ground Script from the DAS; and generation of an Absolute Time Commands (ATC) load; Telemetry, by capturing, processing and archiving emulated health and safety telemetry data; Analysis, by performing analysis on archived data captured in Integrated Test Procedure 1, building analysis datasets, and analyzing the event message log.
<b>Pass/Fail Assessment:</b>	Pass
<b>Date of Test:</b>	21 November 1996; EOC - GSFC Building 32
<b>Test Conduct Summary:</b>	<p>This test verified that FOS successfully accomplishes the following: creates logical strings; receives and archives simulated real-time health and safety telemetry data; constructs telemetry parameters, converts them to engineering units (EU), flags them for limits violations, and displays telemetry values; generates a DAS, ATC load, and integrated load report; displays mission timeline and instrument resources.</p> <p>This test did not confirm that FOS processes and completes an analysis request of archived housekeeping data including building an analysis dataset. This capability was successfully verified in test INT-2020A, however.</p> <p>Real interfaces (EDOS and EBnet) were not used in this test. IST functionality was emulated using an EOC workstation.</p>
<b>NCRs Written:</b>	None
<b>Requirement Verification Status:</b>	Only RBR requirements, not L4 requirements, are mapped to test case INT-2010A as follows:

Test Case	RBR	Text	Interpretation	Clarification	Pass/Fail
INT-2010A	AM1-0020#A	The EOC shall have the capability to send (via EDOS/EBnet and the SN, GN, DSN, or WOTS) and the AM-1 spacecraft shall have the capability to receive spacecraft commands in CCSDS CLTUs (as defined in AM-1 ICD 106).	A: SN Only.		VP
	AM1-0030#A	The EOC shall have the capability to send (via EDOS/EBnet and the SN, GN, DSN, or WOTS) and the AM-1 spacecraft shall have the capability to receive instrument commands in CCSDS CLTUs (as defined in AM-1 ICD 106).			VP
	EOC-2020#A	The EOC shall generate the long-term spacecraft operations plan, based upon, at a minimum, the following: a. LTSP from the IWG. b. LTIPs from the IWG. c. Spacecraft maneuvers and other spacecraft activities that have potential to impact mission operations	A: Based on scheduled activities.		VP
	EOC-2030#A	The EOC shall store and maintain EOS planning and scheduling information, which includes, at a minimum, the following: a. IWG science guidelines, as specified in the LTSP and LTIP b. Long-term spacecraft operations plan c. Predicted availability of the spacecraft resources d. Baseline activity profile for each applicable instrument e. Planning and scheduling information received from the FDF f. Preliminary resource schedules, including TDRSS contact times g. Detailed activity schedules, including TDRSS contact times	A: Basic functionality provided. Scheduled activities (including activity modes and resource usage), BAP definitions, and activity definitions.		VP
	EOC-2040#A	The EOC shall provide to any authorized users (including the ICCs) read-only access to EOS planning and scheduling information.			VPT



Test Case	RBR	Text	Interpretation	Clarification	Pass/Fail
	EOC-2070#A	The EOC shall provide the capability to generate a spacecraft subsystem resource profile, based, at a minimum, on the following: a. Spacecraft orbit maintenance needs b. Spacecraft navigation needs c. Spacecraft subsystem maintenance needs	A: Basic functionality provided		VP
	EOC-2170#A	The EOC shall be capable of planning and scheduling observations for which time may be specified in fixed or variable terms.	A: Basic functionality provided		VP
	EOC-2250#A	The EOC shall be capable of performing its planning and scheduling function in batch and incremental interactive-user modes.			VP
	EOC-2280#A	At least once each week, the EOC shall generate for each spacecraft a preliminary resource schedule that describes all operations currently planned for the following target week.	The mission schedule represents a continuous plan which encompasses the preliminary resource schedule. A: Basic functionality provided	Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VP
	EOC-2300#A	The EOC shall build or update the preliminary resource schedule based on the following, at a minimum: a. Existing preliminary resource schedules, if any b. Instrument resource profiles c. Spacecraft subsystems resource profile d. Science guidelines e. Spacecraft operations constraints f. TDRSS schedule	A: Basic functionality provided. Based on scheduled activities.	Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VPT

Test Case	RBR	Text	Interpretation	Clarification	Pass/Fail
	EOC-2310#A	The EOC shall build a preliminary resource schedule by performing the following: a. Integrating the spacecraft subsystems resource profile and individual instrument resource profiles b. Determining if required resources, including SN resources, are within limits c. Using guidelines established by the LTSP d. Resolving conflicts between the proposed activities	A: Basic functionality provided. Based on scheduled activities.	Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VPT
	EOC-2320#A	The preliminary resource schedule shall include, at a minimum, the following: a. Activity or DAR identifiers b. Resource availability and usage requirements c. Time constraints and alternatives for planned activities d. TDRSS schedule	The mission schedule represents a continuous plan which encompasses the preliminary resource schedule. A: Basic functionality provided. Scheduled activities (includes modes and resources), DAR IDs from ASTER GDS.	Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VPT
	EOC-2350#A	The EOC shall provide the preliminary resource schedule to the ICCs upon generation.	The mission schedule represents a continuous plan which encompasses the preliminary resource schedule. A: Basic functionality provided.	Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VP

Test Case	RBR	Text	Interpretation	Clarification	Pass/Fail
	EOC-2490#A	For each day the EOC shall be capable of generating or updating a detailed activity schedule for each spacecraft and its instruments, nominally covering the next 7 days.		Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VP
	EOC-2510#A	The EOC shall generate a detailed activity schedule for the spacecraft and its instruments by: a. Integrating the spacecraft subsystem activity list and individual instrument activity lists b. Determining if the aggregate resource requirements are within limits d. Ensuring that all the sequencing constraints among the proposed activities are respected e. Scheduling the spacecraft recorder, direct downlink, and communication subsystem operations	The mission schedule represents a continuous plan which encompasses the generation of a detailed activity schedule. A: By scheduling activities and checking resource usage.	Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VP
	EOC-2550#A	The detailed activity schedule shall include, at a minimum, the following: a. Instrument activities b. Spacecraft activities necessary to support all instrument activities c. Spacecraft activities necessary for the spacecraft subsystem maintenance d. Spacecraft resource requirements for each activity e. Traceability of instrument activities to DARs		Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VP

Test Case	RBR	Text	Interpretation	Clarification	Pass/Fail
	EOC-3020#A	The EOC shall accept from the ICC instrument loads, SCC-stored instrument commands, and SCC-stored instrument tables as well as the associated information that includes at a minimum the following: a. Instrument identifier b. Schedule identifier, if applicable c. Identification of commands that could impact spacecraft or instrument safety (i.e., critical commands)			VPT
	EOC-3050#A	At least once per day, the EOC shall generate SCC-stored spacecraft commands and SCC-stored spacecraft tables based on the detailed activity schedule.	A: Basic functionality provided		VP
	EOC-3080#A	The EOC shall generate, validate, and store preplanned spacecraft commands for later use in emergency situations to protect the health and safety of the spacecraft.	A: Basic functionality provided		VPT
	EOC-3090#A	As frequently as necessitated by the detailed activity schedule, the EOC shall build a spacecraft and instrument memory load, which includes as many of the following as needed: a. SCC-stored spacecraft and instrument commands b. SCC-stored spacecraft and instrument tables c. Instrument loads d. SCC software updates.	A: Basic functionality provided. Limited ATC load, tables, and microprocessor load.		VPT
	EOC-3210#A	The EOC shall store and maintain preplanned instrument commands for all instruments on the spacecraft.			VP
	EOC-4010#A	For each spacecraft and its instruments, the EOC shall prepare uplink data that conform to the CCSDS Telecommand Standard.	A: Basic functionality provided		VP
	EOC-6010#A	The EOC shall provide the capability to perform analysis on real-time telemetry data and spacecraft recorder housekeeping data.	A: RT HK data.		VPT
	EOC-6080#A	The EOC shall provide the capability to define, check, and manage spacecraft operations procedures.			VP

Test Case	RBR	Text	Interpretation	Clarification	Pass/Fail
	EOC-6195#A	The EOC shall provide the capability to detect, isolate, and report failures and anomalies at the spacecraft subsystem level, and the spacecraft level.	A: Basic functionality provided.		VPT
	EOSD0010#A	ECS shall use and support the Space Network (SN), via the EDOS/EBnet interface, to obtain the forward and return link data communications needed to achieve full end-to-end ECS functionality.	A: ONLY THE GSFC AND LARC DAACS WILL INTERFACE WITH EDOS		VP
	EOSD1502#A	ECS elements shall use EBnet for data communications for the following types of data: a. Production data sets (Level 0 data) b. Expedited data sets c. Real-time data (for health and safety) d. Command data e. Data requested from back-up archive f. TDRSS schedule requests g. Data exchange with the FDF h. Production Data Transfers between DAACs i. Management Data exchange with SMC j. Data Products Exchange with ADCs, IPs, and Others	A: To support AM-1 testing. FOS A: Real time data (health and safety), commands, limited exchange with NCC and FDF.		VP
	ICC-2010#A	The ICC shall have the capability to access the EOC planning and scheduling information.	A: Basic functionality provided.		VPT
	ICC-2020#A	Upon request from the PI/TL at the IST, the ICC shall provide the IST with planning and scheduling information, which includes, at a minimum, the following: a. LTSP and LTIP b. Current resource availability information c. Current predicted orbit data and related information. d. Plans and schedules	A: Basic functionality provided. Scheduled activities (includes modes and resource usage).		VPT

Test Case	RBR	Text	Interpretation	Clarification	Pass/Fail
	ICC-2140#A	At least once each week, the ICC shall build an instrument resource profile or an instrument resource deviation list (when a baseline resource profile exists for the instrument), which includes a description of instrument operations currently planned for the target week.	The mission schedule represents a continuous plan that encompasses instrument resource profiles and deviations. A: Basic functionality provided.	Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VP
	ICC-2220#A	The ICC shall be able to generate the instrument resource profile in both machine usable and human readable forms.	A: Basic functionality provided.	Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VPT
	ICC-2250#A	The ICC shall accept the preliminary resource schedule from the EOC.		Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VP

Test Case	RBR	Text	Interpretation	Clarification	Pass/Fail
	ICC-2420#A	The ICC shall send to the IST the generated instrument activity list (or instrument activity deviation list) to be reviewed and/or approved by the PI/TL.		Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VP
	ICC-2430#A	The ICC shall notify the PI/TL at the IST of any problems encountered while building or updating its instrument activity list (or instrument activity deviation list).		Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VP
	ICC-3090#A	The ICC shall generate, validate, and store, as command groups, preplanned instrument commands for later use in emergency situations to protect the health and safety of its instrument.	A: Basic functionality provided.		VPT
	ICC-3110#A	The ICC shall be able to generate, validate, and store preplanned contingency instrument commands to be used in event of instrument anomalies.	A: Basic functionality provided.		VPT
	ICC-3150#A	The ICC shall be able to accept from the PI/TL, via the IST, instrument memory loads, including software and table updates.			VPT

Test Case	RBR	Text	Interpretation	Clarification	Pass/Fail
	ICC-3210#A	The ICC shall provide the EOC with instrument loads, SCC-stored instrument commands, SCC-stored instrument tables, preplanned real-time instrument commands, and associated information that includes, at a minimum, the following: a. Instrument identifier b. Schedule identifier, if applicable c. Critical command information			VPT
	ICC-4410#A	The ICC shall provide the capability to perform analysis on real-time data, spacecraft recorder data, and data from the ICC history log.	A: Basic functionality provided. RT HK data.		VPT
	ICC-4470#A	The ICC shall provide the capability to define, check, and manage instrument-specific operations procedures.	A: Basic functionality provided.		VP
	NI-0020#A	ECS shall have the capability to communicate with the TDRSS for transmitting commands to EOS spacecraft (via the EDOS/EBnet interface). Mission-specific requirements for supporting EOS spacecraft command operations will be documented in the EOS mission-level Detailed Mission Requirements documents.			VP



<b>Test Procedure Deviations:</b>	Due to software/system problems, the Analysis Request Sub-procedure was not completed, but was rerun successfully as part of test INT-2020A.
<b>Test Case Number and Title:</b>	INT-2020A End-to-End Test #3: Standby Telemetry Processing; Ground Script Execution; Table Load Generation
<b>Reference to Test Documentation:</b>	FOS Release A Integration & Test Procedures (322-CD-010-003)
<b>Test Summary:</b>	This test procedure builds upon Integrated Test Procedures 1 and 2 and accomplishes several FOS activities concurrently to simulate the operational environment. The test procedure verifies and demonstrates functions of Planning and Scheduling, by creating a Table Load; Commanding, by acquiring user authority for commanding, merging individual commands with the ground script, generating and validating contingency instrument commands, and preparing and transmitting real-time commands; Telemetry, by processing and archiving simulated standby data.
<b>Pass/Fail Assessment:</b>	Pass
<b>Date of Test:</b>	21 November 1996; EOC - GSFC Building 32
<b>Test Conduct Summary:</b>	<p>This test procedure verified that FOS successfully accomplishes the following: creates logical strings; receives and archives simulated real-time standby telemetry data; constructs telemetry parameters, converts them to engineering units (EU), flags them for limits violations, and displays telemetry values; authorizes command authority; views the ground script and executes it in auto mode; transmits ATC load to the simulated EDOS; generates and validates real-time commands and contingency command groups, merges them with the ground script, and transmits them to the simulated EDOS.</p> <p>Although this test does not contain the Analysis Request sub-procedure (contained in test INT-2010A), this sub-procedure was re-executed in this test (INT-2020A). The results confirmed that FOS successfully processes and completes an analysis request of archived housekeeping data including building an analysis dataset.</p>

Real interfaces (EDOS and EBnet) were not used in this test. IST functionality was emulated using an EOC workstation.

**NCRs Written:**

ECSed04737

ECSed04736

ECSed04738

ECSed04666

**Requirement Verification Status:**

Only RBR requirements, not L4 requirements, are mapped to test INT-2020A.

Test Case	RBR	Text	Interpretation	Clarification	Pass/Fail
INT-2020A	EOC-2180#A	The EOC shall be capable of planning and scheduling observations for those EOS instruments whose operations may be periodic, intermittent, or continuous.	A: Basic functionality provided		VP
	EOC-2480#A	The EOC shall accept from each ICC an instrument activity list or an instrument activity deviation list (when an activity profile exists for the instrument) and any updates thereto.	The mission schedule represents a continuous plan which encompasses activity deviations and BAPs. Basic functionality provided.	Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VP

Test Case	RBR	Text	Interpretation	Clarification	Pass/Fail
	EOC-2620#A	The EOC shall provide the ICC with the detailed activity schedule and any updates upon generation.	The mission schedule represents a continuous plan which encompasses the generation of a detailed activity schedule; Basic functionality provided	Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VP
	EOC-3238#A	Within 1 minute of detecting a predefined emergency/contingency situation, the EOC shall prepare spacecraft and instrument commands for transmission to EDOS.			VP
	EOC-4005#A	The EOC shall be capable of transmitting commands to the EOS spacecraft via EDOS using the: a. SN b. GN, DSN, WOTS (for contingency or emergency operations)	A: SN only.		VP
	EOC-4008#A	The EOC shall be capable of transmitting commands via Ecom.			VP

Test Case	RBR	Text	Interpretation	Clarification	Pass/Fail
	EOC-4015#A	The EOC shall provide the capability to build real-time commands based on operator input and validate the generated commands.	A: Basic functionality provided		VPT
	EOC-4018#A	The EOC shall validate instrument real-time command groups.	A: Basic functionality provided		VPT
	EOC-4020#A	The EOC shall merge the real-time commands supplied by the spacecraft operator, command groups, and the spacecraft and instrument memory loads into one uplink stream.	A: Basic functionality provided. Real time commands only.		VP
	EOC-4140#A	The EOC shall generate command-related event messages for display and for history logging to include: a. Command uplink status			VP
	EOSD1770#A	ECS elements shall exchange the following types of data at a minimum with the IPs: a. Instrument command loads b. Science data c. Planning and scheduling data d. Directories e. Product Orders	Planning and scheduling data includes instrument stored commands. A: Limited interface testing with ASTER (selected planning and scheduling data). Note: Instrument command load information is included in planning and scheduling data.		VP

Test Case	RBR	Text	Interpretation	Clarification	Pass/Fail
	EOSD2480#A	ECS elements shall require unique sessions when security controlled data are being manipulated.			VP
	ICC-2190#A	The ICC shall build or update its instrument resource profile, or when a resource profile exists, its instrument resource deviation list, based, at a minimum, on the following: a. PI/TL provided instrument deviation requests b. LTSP and LTIP c. Current resource availability d. Current predicted orbit data and related information	A: Basic functionality provided. Scheduled activities (includes modes and resources).	Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VP
	ICC-2210#A	The ICC shall ensure that its instrument resource profile contains no internal conflicts.		Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VPT

Test Case	RBR	Text	Interpretation	Clarification	Pass/Fail
	ICC-2230#A	When generated, the ICC shall provide the EOC with its instrument resource profile or, when a resource profile exists, an instrument resource deviation list.		Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VP
	ICC-2270#A	For each day the ICC shall be capable of generating or updating, an instrument activity list or an instrument activity deviation list (when an activity profile exists for the instrument) nominally covering the next 7 days.	A: Basic functionality provided.	Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VP

Test Case	RBR	Text	Interpretation	Clarification	Pass/Fail
	ICC-2280#A	<p>The ICC shall generate or update the instrument activity list, or when a baseline activity profile exists, the instrument activity deviation list, based, at a minimum, on the following:</p> <ul style="list-style-type: none"> <li>a. PI/TL provided instrument deviation requests.</li> <li>b. LTSP and LTIP</li> <li>c. Preliminary resource schedule</li> <li>d. Current resource availability information</li> <li>e. Current predicted orbit data and related information</li> <li>f. Responses to contingency/emergency conditions</li> <li>g. Rejection notification from the EOC of the activities that cannot be accommodated in the detailed activity schedule</li> </ul>	A: Basic functionality provided. Scheduled activities (includes modes and resources).	<p>Instrument resource profiles, activity lists, &amp; deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage.</p> <p>Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft &amp; its instruments.</p>	VP



Test Case	RBR	Text	Interpretation	Clarification	Pass/Fail
	ICC-2290#A	<p>The ICC shall generate the instrument activity list or the instrument activity deviation list (when an activity profile exists for the instrument) in both machine-usable and human-readable forms, to describe for each activity, at a minimum, as many of the following that apply:</p> <ul style="list-style-type: none"> <li>a. Activity identifier including traceability to PI/TL provided deviation requests.</li> <li>b. Objectives</li> <li>c. Resource requirements</li> <li>d. Start time constraints and duration</li> <li>e. Instrument modes as a function of time</li> <li>f. Pointing angles and field of view (FOV)</li> <li>g. Specified tolerance limits</li> <li>h. Disturbances caused for each instrument mode</li> </ul>	A: Basic functionality provided.	<p>Instrument resource profiles, activity lists, &amp; deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage.</p> <p>Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft &amp; its instruments.</p>	VP
	ICC-2390#A	<p>The ICC shall provide the EOC with the instrument activity list or instrument activity deviation list (when an activity profile exists for the instrument) and any updates thereto, when generated.</p>		<p>Instrument resource profiles, activity lists, &amp; deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage.</p> <p>Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft &amp; its instruments.</p>	VP

Test Case	RBR	Text	Interpretation	Clarification	Pass/Fail
	ICC-2400#A	The ICC shall have the capability to update the instrument activity list or instrument activity deviation list (when an activity profile exists for the instrument) in response to instrument malfunctions or other special events that affect the continuation of the existing schedule.		Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VP
	ICC-2420#A	The ICC shall send to the IST the generated instrument activity list (or instrument activity deviation list) to be reviewed and/or approved by the PI/TL.		Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VP

Test Case	RBR	Text	Interpretation	Clarification	Pass/Fail
	ICC-2430#A	The ICC shall notify the PI/TL at the IST of any problems encountered while building or updating its instrument activity list (or instrument activity deviation list).		Instrument resource profiles, activity lists, & deviation lists are equivalent to activities. Mode transitions in activity definitions define resource usage. Preliminary resource schedules and activity schedules are equivalent to mission schedules; mission schedules are integrated schedules containing scheduled activities for a spacecraft & its instruments.	VP
	ICC-3010#A	The ICC shall validate SCC-stored instrument tables, as appropriate, that are generated at the ICC.			VP
	ICC-3270#A	The ICC shall be able to generate and validate emergency/contingency instrument command groups in emergency/contingency situations.			VPT

**Test Procedure Deviations:**

The Analysis Request Sub-procedure, which is included in test INT-2010A, was successfully re-executed as part of this test (INT-2020A).

### 3.4 FOS Requirements Status

The FOS Test Program focused on the verification of FOS RBR requirements as specified in the Functional and Performance Requirements Specification (#423-41-02), non mission-specific level 4 requirements as specified in the FOS Requirements Specification for the ECS Project, Volume 1 (#304-CD-001-003) and mission-specific Level 4 requirements as specified in the FOS Requirements Specification for the ECS Project, Volume 2 (#304-CD-004-003). The following tables represent the verification status of these requirements resulting from the execution of test procedures during the formal FOS Release A Acceptance Test Phase (for those tests executed twice, the status reflects results from the latest “pass”).

**Table 3.4-1. FOS Level 4 Requirements Status**

Subsystem	Pass	Partial	Fail	Unverified	Totals
ANA	19	5	6	1	31
CMD	22	5	4	6	37
CMS	34	1	4	1	40
DMS	22	5	1	2	30
FOS	7	0	0	2	9
FUI	122	18	15	4	159
HRD	53	5	4	1	63
PAS	24	0	0	0	24
RMS	13	1	0	0	14
TLM	40	9	2	2	53
Totals	356	49	36	19	460
	77 %	10 %	7 %	6%	

**Table 3.4-2. FOS RBR Requirements Status**

Req't Type	Pass	Partial	Fail	Unverified	Totals
AM1	4	2	0	2	8
ASTER	2	0	0	1	3
EOC	41	44	0	1	86
EOSD	19	4	0	10	33
FOS	3	1	0	0	4
ICC	39	34	1	0	74
NI	4	2	0	2	8
Totals	112	87	1	16	216
	52%	40%	1%	7%	

### 3.5 FOS NCR Status

Non-conformance reports (NCRs) are generated during the dry-run and formal test period by cognizant test engineers, Quality Assurance, NASA witnesses and programmers during the dry-run and formal test periods. In general terms, NCRs are generated for any of the following general circumstances: 1) Any requirement which is not provided by the FOS software as a whole or only partially provided; 2) Any provided functional software/hardware “piece” where that “piece” is not fully functional 3) useability of the tested function does not meet operational standards.

NCRs are broken down into 3 priority categories. Level 1,2 and 3. Level 1 NCRs are those which inhibit operational functionality, thus rendering any further testing as futile (i.e. show-stoppers). Level 2 NCRs are those which inhibit a specific function from working nominally, but a workaround is available. Level 3 NCRs are those which affect “look and feel” of specific functions but do not hamper associated functionality.

The following tables represent the FOS NCR status resulting from the execution of test procedures during the formal test timeframe (dry-run information is also provided to provide NCR history; for details concerning NCRs written and entered into DDTs during the dry run phase, see document 324-CD-004-001 (FOS Release A Integration and Test Reports)).

***Table 3.5-1. Opened FOS NCRs (Dry-Run & Formal Acceptance Test)***

Severity	At TRR	Pass 1 Dry Run	Pass 2 Dry Run	Pass 3 Dry Run	Formal Test	Totals
Level 1	20	28	7	3	0	58
Level 2	69	51	18	71	30	239
Level 3	107	76	14	38	39	274
<b>Totals</b>	196	155	39	112	69	571

***Table 3.5-2. Closed FOS NCRs (Dry Run & Formal Acceptance Test)***

Severity	Pass 1 Dry Run	Pass 2 Dry Run	Pass 3 Dry Run	Formal Test	Totals
Level 1	12	24	17	6	59
Level 2	12	38	45	23	118
Level 3	20	44	29	38	131
<b>Totals</b>	44	106	91	67	308

## Appendix A. FOS RBR Test Status Matrix

The following matrix delineates each applicable FOS Release A RBR and IRD requirement and associated verification status. Verification status information provided, including date verified reflects FOS Formal Acceptance Test execution results as reported at the FOS RRR.

FOS RBR Requirements			
Req. ID	Verification Method	Verification Status	Date verified
AM1-0020#A	test	partially verified	13-Nov-96
AM1-0030#A	test	partially verified	22-Nov-96
AM1-0050#A	test	verified passed	13-Nov-96
AM1-0120#A	test	un-verified	22-Nov-96
AM1-0125#A	test	verified passed	13-Nov-96
AM1-0215#A	test	verified passed	11-Nov-96
AM1-0230#A	test	verified passed	22-Nov-96
AM1-1050#A	test   analysis	un-verified	22-Nov-96
ASTER-0210#A	test	verified passed	14-Nov-96
ASTER-0240#A	test	verified passed	14-Nov-96
ASTER-1060#A	test	un-verified	22-Nov-96
EDOS-4.1.1.2#A	demo	un-verified	22-Nov-96
EDOS-4.1.1.3#A	demo	partially verified	13-Nov-96
EDOS-4.2.1.5#A	demo	un-verified	22-Nov-96
EDOS-4.6.1.1#A	demo	partially verified	22-Nov-96
EDOS-4.6.1.2#A	demo	verified passed	13-Nov-96
EDOS-4.6.1.3#A	demo	un-verified	22-Nov-96
EOC-0040#A	test	partially verified	13-Nov-96
EOC-2020#A	test	verified passed	13-Nov-96

EOC-2030#A	demo	verified passed	14-Nov-96
EOC-2040#A	inspection	partially verified	14-Nov-96
EOC-2045#A	demo	partially verified	14-Nov-96
EOC-2070#A	test	verified passed	13-Nov-96
EOC-2170#A	demo	verified passed	13-Nov-96
EOC-2180#A	demo	verified passed	13-Nov-96
EOC-2200#A	demo	verified passed	13-Nov-96
EOC-2210#A	inspection	verified passed	14-Nov-96
EOC-2220#A	test	partially verified	14-Nov-96
EOC-2250#A	demo	verified passed	13-Nov-96
EOC-2270#A	demo	verified passed	13-Nov-96
EOC-2272#A	test	verified passed	13-Nov-96
EOC-2280#A	test	verified passed	13-Nov-96
EOC-2290#A	demo	verified passed	14-Nov-96
EOC-2300#A	test	partially verified	14-Nov-96
EOC-2310#A	test	partially verified	14-Nov-96
EOC-2320#A	inspection	partially verified	14-Nov-96
EOC-2350#A	demo	verified passed	14-Nov-96
EOC-2460#A	test	verified passed	13-Nov-96
EOC-2480#A	demo	verified passed	14-Nov-96
EOC-2482#A	test	verified passed	13-Nov-96
EOC-2490#A	test	verified passed	13-Nov-96
EOC-2510#A	test	verified passed	14-Nov-96
EOC-2540#A	test	verified passed	13-Nov-96
EOC-2550#A	test	verified passed	14-Nov-96
EOC-2555#A	test	verified passed	14-Nov-96
EOC-2620#A	test	verified passed	14-Nov-96

EOC-3020#A	test	partially verified	13-Nov-96
EOC-3030#A	test	partially verified	22-Nov-96
EOC-3050#A	test	verified passed	22-Nov-96
EOC-3080#A	test	partially verified	22-Nov-96
EOC-3090#A	test	partially verified	14-Nov-96
EOC-3160#A	demo	verified passed	11-Nov-96
EOC-3210#A	test	verified passed	14-Nov-96
EOC-3238#A	test	verified passed	21-Nov-96
EOC-4005#A	test	partially verified	22-Nov-96
EOC-4008#A	test	partially verified	22-Nov-96
EOC-4010#A	analysis	partially verified	22-Nov-96
EOC-4015#A	test	partially verified	21-Nov-96
EOC-4018#A	demo	partially verified	22-Nov-96
EOC-4020#A	test	partially verified	21-Nov-96
EOC-4060#A	test	verified passed	13-Nov-96
EOC-4100#A	demo	partially verified	22-Nov-96
EOC-4140#A	demo	partially verified	22-Nov-96
EOC-4200#A	test	un-verified	22-Nov-96
EOC-5010#A	analysis	partially verified	19-Nov-96
EOC-5015#A	test	verified passed	13-Nov-96
EOC-5020#A	test	verified passed	13-Nov-96
EOC-5030#A	test	verified passed	13-Nov-96
EOC-5070#A	test	partially verified	19-Nov-96
EOC-5080#A	test	partially verified	19-Nov-96
EOC-5090#A	test	partially verified	19-Nov-96
EOC-5100#A	test	partially verified	19-Nov-96
EOC-5110#A	test	partially verified	15-Nov-96



EOC-6010#A	test	partially verified	20-Nov-96
EOC-6050#A	test	partially verified	22-Nov-96
EOC-6060#A	test	partially verified	15-Nov-96
EOC-6070#A	test	partially verified	20-Nov-96
EOC-6080#A	test	verified passed	14-Nov-96
EOC-6100#A	test	partially verified	20-Nov-96
EOC-6110#A	demo	verified passed	22-Nov-96
EOC-6195#A	test	partially verified	12-Nov-96
EOC-7010#A	demo	partially verified	15-Nov-96
EOC-7015#A	test	partially verified	13-Nov-96
EOC-7025#A	test	verified passed	13-Nov-96
EOC-7030#A	test	verified passed	13-Nov-96
EOC-7045#A	test	verified passed	11-Nov-96
EOC-7060#A	test	partially verified	20-Nov-96
EOC-7120#A	demo	partially verified	13-Nov-96
EOC-7130#A	demo	partially verified	13-Nov-96
EOC-8010#A	demo	partially verified	12-Nov-96
EOC-8090#A	test	partially verified	12-Nov-96
EOC-8110#A	demo	verified passed	12-Nov-96
EOC-8130#A	test	verified passed	25-Nov-96
EOC-8140#A	test	verified passed	12-Nov-96
EOC-8285#A	demo	partially verified	12-Nov-96
EOC-9010#A	demo	partially verified	20-Nov-96
EOC-9020#A	demo	partially verified	20-Nov-96
EOC-9025#A	test	partially verified	13-Nov-96
EOC-9040#A	test	partially verified	21-Nov-96
EOC-9080#A	test	verified passed	14-Nov-96

EOC-9090#A	test	partially verified	14-Nov-96
EOC-9110#A	demo	verified passed	20-Nov-96
EOC-9130#A	demo	verified passed	20-Nov-96
EOSD0010#A	test	partially verified	13-Nov-96
EOSD0020#A	test	partially verified	22-Nov-96
EOSD0025#A	test	un-verified	22-Nov-96
EOSD0500#A	test	partially verified	13-Nov-96
EOSD0502#A	demo	verified passed	12-Nov-96
EOSD0545#A	analysis	verified passed	11-Nov-96
EOSD0630#A	demo	verified passed	12-Nov-96
EOSD0730#A	test	verified passed	12-Nov-96
EOSD0740#A	test	verified passed	12-Nov-96
EOSD0750#A	demo	verified passed	12-Nov-96
EOSD0760#A	demo	verified passed	12-Nov-96
EOSD0780#A	demo	verified passed	12-Nov-96
EOSD0800#A	demo	verified passed	12-Nov-96
EOSD1010#A	test	un-verified	22-Nov-96
EOSD1502#A	demo	partially verified	22-Nov-96
EOSD1605#A	test	partially verified	13-Nov-96
EOSD1770#A	test	verified passed	14-Nov-96
EOSD1990#A	inspection	verified passed	11-Nov-96
EOSD2100#A	inspection	verified passed	11-Nov-96
EOSD2200#A	inspection	verified passed	11-Nov-96
EOSD2400#A	test	verified passed	11-Nov-96
EOSD2430#A	test	verified passed	11-Nov-96
EOSD2440#A	test	verified passed	11-Nov-96
EOSD2480#A	test	verified passed	11-Nov-96

EOSD2510#A	demo	un-verified	22-Nov-96
EOSD2550#A	test	un-verified	22-Nov-96
EOSD2660#A	demo	un-verified	22-Nov-96
EOSD2710#A	demo	un-verified	22-Nov-96
EOSD2990#A	demo	un-verified	22-Nov-96
EOSD3000#A	demo	un-verified	22-Nov-96
EOSD3200#A	inspection	verified passed	11-Nov-96
EOSD3490#A	demo	un-verified	22-Nov-96
EOSD4100#A	test	verified passed	12-Nov-96
FOS-0020#A	test	verified passed	12-Nov-96
FOS-0025#A	demo	verified passed	12-Nov-96
FOS-0030#A	demo	verified passed	14-Nov-96
FOS-0040#A	test	partially verified	21-Nov-96
ICC-0010#A	test	verified passed	14-Nov-96
ICC-0030#A	test	verified passed	14-Nov-96
ICC-2010#A	test	partially verified	14-Nov-96
ICC-2020#A	demo	partially verified	14-Nov-96
ICC-2050#A	test	verified passed	14-Nov-96
ICC-2115#A	test	verified passed	13-Nov-96
ICC-2140#A	test	verified passed	13-Nov-96
ICC-2150#A	test	verified passed	14-Nov-96
ICC-2190#A	test	verified passed	14-Nov-96
ICC-2210#A	test	partially verified	14-Nov-96
ICC-2220#A	demo	partially verified	14-Nov-96
ICC-2230#A	demo	verified passed	13-Nov-96
ICC-2250#A	test	verified passed	14-Nov-96
ICC-2270#A	test	verified passed	13-Nov-96

ICC-2280#A	test	verified passed	14-Nov-96
ICC-2290#A	test	verified passed	14-Nov-96
ICC-2300#A	test	verified passed	13-Nov-96
ICC-2390#A	test	verified passed	13-Nov-96
ICC-2400#A	test	verified passed	13-Nov-96
ICC-2420#A	test	verified passed	14-Nov-96
ICC-2430#A	test	verified passed	13-Nov-96
ICC-3010#A	test	verified passed	22-Nov-96
ICC-3040#A	test	verified passed	22-Nov-96
ICC-3090#A	analysis	partially verified	22-Nov-96
ICC-3100#A	inspection	partially verified	22-Nov-96
ICC-3110#A	inspection	partially verified	22-Nov-96
ICC-3150#A	test	partially verified	22-Nov-96
ICC-3210#A	inspection	partially verified	22-Nov-96
ICC-3270#A	test	partially verified	22-Nov-96
ICC-4010#A	test	verified passed	13-Nov-96
ICC-4020#A	test	partially verified	19-Nov-96
ICC-4045#A	test	partially verified	13-Nov-96
ICC-4090#A	test	partially verified	19-Nov-96
ICC-4100#A	test	partially verified	19-Nov-96
ICC-4150#A	test	partially verified	15-Nov-96
ICC-4410#A	test	partially verified	20-Nov-96
ICC-4450#A	test	partially verified	15-Nov-96
ICC-4460#A	test	partially verified	15-Nov-96
ICC-4470#A	test	verified passed	20-Nov-96
ICC-4490#A	test	verified passed	22-Nov-96
ICC-4560#A	test	partially verified	14-Nov-96

ICC-4710#A	inspection	partially verified	13-Nov-96
ICC-4730#A	test	verified passed	13-Nov-96
ICC-4740#A	test	verified passed	13-Nov-96
ICC-4750#A	inspection	verified passed	11-Nov-96
ICC-4760#A	test	verified passed	11-Nov-96
ICC-4770#A	test	verified passed	13-Nov-96
ICC-4775#A	demo	partially verified	13-Nov-96
ICC-4780#A	test	partially verified	20-Nov-96
ICC-4790#A	test	partially verified	14-Nov-96
ICC-6005#A	demo	partially verified	12-Nov-96
ICC-6020#A	demo	partially verified	12-Nov-96
ICC-6040#A	test	verified passed	12-Nov-96
ICC-6070#A	test	verified passed	12-Nov-96
ICC-6145#A	inspection	verified passed	22-Nov-96
ICC-6510#A	inspection	partially verified	20-Nov-96
ICC-6520#A	inspection	partially verified	14-Nov-96
ICC-6525#A	test	partially verified	13-Nov-96
ICC-6540#A	test	partially verified	21-Nov-96
ICC-6580#A	test	verified passed	14-Nov-96
ICC-6590#A	test	partially verified	15-Nov-96
ICC-6600#A	demo	verified passed	22-Nov-96
ICC-6620#A	demo	verified passed	22-Nov-96
ICC-7010#A	test	verified passed	13-Nov-96
ICC-7050#A	test	partially verified	13-Nov-96
ICC-7060#A	test	verified passed	22-Nov-96
ICC-7070#A	test	failed	22-Nov-96
ICC-7210#A	test	verified passed	13-Nov-96

ICC-7214#A	test	verified passed	14-Nov-96
ICC-7220#A	test	partially verified	14-Nov-96
ICC-7230#A	demo	verified passed	13-Nov-96
ICC-7460#A	test	partially verified	14-Nov-96
ICC-7500#A	test	verified passed	22-Nov-96
ICC-7510#A	test	partially verified	14-Nov-96
NI-0010#A	test	partially verified	13-Nov-96
NI-0020#A	test	partially verified	22-Nov-96
NI-0030#A	test	verified passed	13-Nov-96
NI-0110#A	test	un-verified	22-Nov-96
NI-0150#A	test	verified passed	13-Nov-96
NI-0160#A	test	verified passed	13-Nov-96
NI-0230#A	demo	verified passed	13-Nov-96
NI-0310#A	test	un-verified	22-Nov-96

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## Appendix B. FOS Level 4 Requirement Test Status Matrix

The following matrix delineates each applicable FOS Level 4 requirement, including mission and non-mission specific requirements, and associated verification information. Verification status information provided, including date verified reflects FOS Formal Acceptance Test execution results as reported at the FOS RRR.

FOS L4 Requirements			
Req. ID	Verification Method	Verification Status	Date verified
F-ANA-01010	test	partially verified	20-Nov-96
F-ANA-01020	test	verified passed	22-Nov-96
F-ANA-03010	analysis	partially verified	20-Nov-96
F-ANA-03015	analysis	partially verified	22-Nov-96
F-ANA-03020	analysis	verified passed	22-Nov-96
F-ANA-03030	demo	verified passed	22-Nov-96
F-ANA-03040	analysis	failed	22-Nov-96
F-ANA-03050	analysis	verified passed	22-Nov-96
F-ANA-03070	analysis	failed	22-Nov-96
F-ANA-03080	analysis	verified passed	22-Nov-96
F-ANA-03135	analysis	verified passed	20-Nov-96
F-ANA-04010	analysis	verified passed	20-Nov-96
F-ANA-04060	analysis	un-verified	20-Nov-96
F-ANA-04070	inspection	verified passed	20-Nov-96
F-ANA-04080	analysis	verified passed	20-Nov-96
F-ANA-04090	analysis	failed	20-Nov-96
F-ANA-04100	analysis	verified passed	20-Nov-96
F-ANA-04110	analysis	verified passed	20-Nov-96



F-ANA-04130	analysis	verified passed	20-Nov-96
F-ANA-04315	analysis	verified passed	22-Nov-96
F-ANA-04320	analysis	partially verified	22-Nov-96
F-ANA-04330	analysis	verified passed	22-Nov-96
F-ANA-04340	analysis	verified passed	22-Nov-96
F-ANA-05210	analysis	verified passed	22-Nov-96
F-ANA-05220	analysis	verified passed	22-Nov-96
F-ANA-05250	analysis	verified passed	22-Nov-96
F-ANA-08010	analysis	partially verified	22-Nov-96
F-ANA-08020	analysis	verified passed	22-Nov-96
F-ANA-08030	demo	failed	22-Nov-96
F-ANA-08040	demo	failed	22-Nov-96
F-ANA-08050	demo	failed	22-Nov-96
F-CMD-01120	demo	un-verified	22-Nov-96
F-CMD-01160	demo	un-verified	22-Nov-96
F-CMD-01310	demo	verified passed	20-Nov-96
F-CMD-01315	demo	verified passed	21-Nov-96
F-CMD-01317	demo	verified passed	21-Nov-96
F-CMD-02110	test	failed	22-Nov-96
F-CMD-02135	test	verified passed	22-Nov-96
F-CMD-02140	test	un-verified	22-Nov-96
F-CMD-02210	test	verified passed	22-Nov-96
F-CMD-02215	test	verified passed	22-Nov-96
F-CMD-02220	test	failed	22-Nov-96
F-CMD-02225	test	verified passed	22-Nov-96
F-CMD-02230	test	failed	22-Nov-96
F-CMD-02235	test	un-verified	22-Nov-96

F-CMD-02240	test	verified passed	22-Nov-96
F-CMD-02245	test	verified passed	22-Nov-96
F-CMD-02250	test	partially verified	22-Nov-96
F-CMD-02255	test	un-verified	22-Nov-96
F-CMD-02260	test	verified passed	22-Nov-96
F-CMD-03110	test	failed	22-Nov-96
F-CMD-03115	test	verified passed	25-Nov-96
F-CMD-03125	test	verified passed	25-Nov-96
F-CMD-03127	test	verified passed	25-Nov-96
F-CMD-03130	test	verified passed	25-Nov-96
F-CMD-03133	test	verified passed	25-Nov-96
F-CMD-03135	test	partially verified	22-Nov-96
F-CMD-03210	test	verified passed	21-Nov-96
F-CMD-03215	test	verified passed	21-Nov-96
F-CMD-03225	test	verified passed	21-Nov-96
F-CMD-03410	test	partially verified	21-Nov-96
F-CMD-04115	demo	partially verified	22-Nov-96
F-CMD-04120	demo	verified passed	22-Nov-96
F-CMD-11210	demo	un-verified	22-Nov-96
F-CMD-11226	test	verified passed	22-Nov-96
F-CMD-12130	test	partially verified	22-Nov-96
F-CMD-12245	test	verified passed	22-Nov-96
F-CMD-14313	test	verified passed	22-Nov-96
F-CMS-00105	test	verified passed	22-Nov-96
F-CMS-00110	test	verified passed	22-Nov-96
F-CMS-00210	test	verified passed	22-Nov-96
F-CMS-00215	test	verified passed	22-Nov-96

F-CMS-00220	demo	verified passed	22-Nov-96
F-CMS-00240	test	verified passed	22-Nov-96
F-CMS-00425	test	verified passed	22-Nov-96
F-CMS-00610	analysis	verified passed	22-Nov-96
F-CMS-00615	test	verified passed	22-Nov-96
F-CMS-00640	test	verified passed	22-Nov-96
F-CMS-00820	test	verified passed	22-Nov-96
F-CMS-00830	test	failed	22-Nov-96
F-CMS-00840	test	verified passed	22-Nov-96
F-CMS-01010	demo	verified passed	22-Nov-96
F-CMS-01020	demo	verified passed	22-Nov-96
F-CMS-01025	demo	failed	22-Nov-96
F-CMS-01028	demo	failed	22-Nov-96
F-CMS-01029	analysis	un-verified	22-Nov-96
F-CMS-01030	analysis	verified passed	22-Nov-96
F-CMS-01110	test	verified passed	22-Nov-96
F-CMS-01120	test	verified passed	22-Nov-96
F-CMS-01130	test	verified passed	22-Nov-96
F-CMS-01305	demo	verified passed	22-Nov-96
F-CMS-01310	analysis	partially verified	22-Nov-96
F-CMS-01320	test	verified passed	22-Nov-96
F-CMS-01325	test	verified passed	22-Nov-96
F-CMS-10110	test	verified passed	22-Nov-96
F-CMS-10120	test	verified passed	22-Nov-96
F-CMS-10125	test	failed	22-Nov-96
F-CMS-10250	test	verified passed	22-Nov-96
F-CMS-10255	analysis	verified passed	22-Nov-96

F-CMS-10710	test	verified passed	22-Nov-96
F-CMS-10730	test	verified passed	22-Nov-96
F-CMS-10740	test	verified passed	22-Nov-96
F-CMS-11185	test	verified passed	22-Nov-96
F-CMS-11190	test	verified passed	22-Nov-96
F-CMS-11310	test	verified passed	22-Nov-96
F-CMS-11320	analysis	verified passed	22-Nov-96
F-CMS-11330	test	verified passed	22-Nov-96
F-CMS-11340	test	verified passed	22-Nov-96
F-DMS-00110	inspection	verified passed	11-Nov-96
F-DMS-00120	inspection	partially verified	11-Nov-96
F-DMS-00130	inspection	verified passed	11-Nov-96
F-DMS-00140	inspection	partially verified	11-Nov-96
F-DMS-00150	inspection	verified passed	13-Nov-96
F-DMS-00160	inspection	verified passed	13-Nov-96
F-DMS-00310	demo	verified passed	11-Nov-96
F-DMS-00320	demo	verified passed	11-Nov-96
F-DMS-00350	inspection	verified passed	11-Nov-96
F-DMS-00360	inspection	verified passed	11-Nov-96
F-DMS-00610	demo	verified passed	13-Nov-96
F-DMS-00620	demo	verified passed	11-Nov-96
F-DMS-00710	inspection	partially verified	14-Nov-96
F-DMS-00770	demo	partially verified	22-Nov-96
F-DMS-00790	demo	failed	22-Nov-96
F-DMS-00910	inspection	verified passed	12-Nov-96
F-DMS-00930	demo	verified passed	13-Nov-96
F-DMS-00940	demo	verified passed	13-Nov-96

F-DMS-01010	inspection	partially verified	14-Nov-96
F-DMS-01020	inspection	verified passed	22-Nov-96
F-DMS-01210	demo	verified passed	12-Nov-96
F-DMS-01220	demo	verified passed	12-Nov-96
F-DMS-01230	demo	verified passed	12-Nov-96
F-DMS-01250	demo	verified passed	12-Nov-96
F-DMS-01260	demo	verified passed	12-Nov-96
F-DMS-01270	demo	un-verified	20-Nov-96
F-DMS-01280	demo	un-verified	20-Nov-96
F-DMS-01310	inspection	verified passed	11-Nov-96
F-DMS-01320	inspection	verified passed	11-Nov-96
F-DMS-01330	inspection	verified passed	11-Nov-96
F-FOS-00025	test	un-verified	14-Nov-96
F-FOS-00240	analysis	verified passed	20-Nov-96
F-FOS-00250	analysis	verified passed	12-Nov-96
F-FOS-00255	analysis	verified passed	12-Nov-96
F-FOS-00347	test	un-verified	22-Nov-96
F-FOS-00420	test	verified passed	12-Nov-96
F-FOS-00450	test	verified passed	11-Nov-96
F-FOS-00455	test	verified passed	11-Nov-96
F-FOS-00460	test	verified passed	11-Nov-96
F-FUI-01100	demo	verified passed	12-Nov-96
F-FUI-01105	test	verified passed	12-Nov-96
F-FUI-01110	test	verified passed	12-Nov-96
F-FUI-01115	test	verified passed	12-Nov-96
F-FUI-01130	demo	verified passed	12-Nov-96
F-FUI-01135	demo	verified passed	12-Nov-96

F-FUI-01140	demo	verified passed	12-Nov-96
F-FUI-01145	test	verified passed	12-Nov-96
F-FUI-01155	test	verified passed	12-Nov-96
F-FUI-01160	test	verified passed	12-Nov-96
F-FUI-01165	demo	verified passed	12-Nov-96
F-FUI-01305	test	verified passed	12-Nov-96
F-FUI-01310	test	verified passed	12-Nov-96
F-FUI-01315	test	partially verified	12-Nov-96
F-FUI-01320	test	verified passed	12-Nov-96
F-FUI-01325	test	verified passed	12-Nov-96
F-FUI-01330	test	verified passed	12-Nov-96
F-FUI-01335	test	partially verified	12-Nov-96
F-FUI-01500	test	verified passed	12-Nov-96
F-FUI-01505	demo	verified passed	12-Nov-96
F-FUI-01510	test	verified passed	14-Nov-96
F-FUI-01515	test	verified passed	14-Nov-96
F-FUI-01520	test	verified passed	14-Nov-96
F-FUI-01525	test	verified passed	14-Nov-96
F-FUI-01530	test	verified passed	14-Nov-96
F-FUI-01535	test	verified passed	14-Nov-96
F-FUI-01538	test	verified passed	14-Nov-96
F-FUI-01540	test	verified passed	14-Nov-96
F-FUI-01545	test	verified passed	14-Nov-96
F-FUI-01550	test	verified passed	14-Nov-96
F-FUI-01555	test	verified passed	14-Nov-96
F-FUI-01560	test	verified passed	14-Nov-96
F-FUI-01570	test	verified passed	14-Nov-96

F-FUI-01585	test	partially verified	14-Nov-96
F-FUI-01590	test	verified passed	14-Nov-96
F-FUI-01591	test	verified passed	14-Nov-96
F-FUI-01595	test	verified passed	12-Nov-96
F-FUI-02625	demo	verified passed	13-Nov-96
F-FUI-02630	test	verified passed	13-Nov-96
F-FUI-02640	test	verified passed	13-Nov-96
F-FUI-02705	demo	verified passed	12-Nov-96
F-FUI-02710	demo	verified passed	12-Nov-96
F-FUI-02715	demo	partially verified	12-Nov-96
F-FUI-02720	demo	failed	12-Nov-96
F-FUI-02725	demo	partially verified	12-Nov-96
F-FUI-02800	demo	verified passed	14-Nov-96
F-FUI-02805	test	verified passed	14-Nov-96
F-FUI-02810	test	verified passed	14-Nov-96
F-FUI-02815	test	verified passed	14-Nov-96
F-FUI-02820	test	verified passed	14-Nov-96
F-FUI-02825	test	verified passed	14-Nov-96
F-FUI-02845	demo	verified passed	14-Nov-96
F-FUI-02850	test	verified passed	14-Nov-96
F-FUI-02855	demo	verified passed	14-Nov-96
F-FUI-02865	demo	verified passed	14-Nov-96
F-FUI-02870	demo	verified passed	14-Nov-96
F-FUI-02875	demo	verified passed	14-Nov-96
F-FUI-02880	demo	verified passed	14-Nov-96
F-FUI-02885	demo	verified passed	14-Nov-96
F-FUI-02890	demo	verified passed	14-Nov-96

F-FUI-02895	demo	verified passed	14-Nov-96
F-FUI-03100	test	verified passed	14-Nov-96
F-FUI-03105	test	verified passed	14-Nov-96
F-FUI-03110	test	verified passed	14-Nov-96
F-FUI-03200	demo	verified passed	22-Nov-96
F-FUI-03205	demo	partially verified	22-Nov-96
F-FUI-03210	demo	verified passed	12-Nov-96
F-FUI-03215	demo	partially verified	22-Nov-96
F-FUI-03220	demo	partially verified	22-Nov-96
F-FUI-03225	demo	verified passed	22-Nov-96
F-FUI-03230	demo	verified passed	22-Nov-96
F-FUI-04000	test	verified passed	14-Nov-96
F-FUI-04010	test	verified passed	14-Nov-96
F-FUI-04020	test	verified passed	14-Nov-96
F-FUI-04030	test	verified passed	14-Nov-96
F-FUI-04040	test	verified passed	14-Nov-96
F-FUI-04060	test	verified passed	14-Nov-96
F-FUI-04070	test	failed	14-Nov-96
F-FUI-04080	test	verified passed	14-Nov-96
F-FUI-04110	test	verified passed	14-Nov-96
F-FUI-04120	test	verified passed	14-Nov-96
F-FUI-04290	demo	verified passed	14-Nov-96
F-FUI-04300	test	failed	14-Nov-96
F-FUI-05100	test	partially verified	22-Nov-96
F-FUI-05110	test	verified passed	22-Nov-96
F-FUI-05115	demo	verified passed	22-Nov-96
F-FUI-05120	test	partially verified	22-Nov-96



F-FUI-05125	demo	verified passed	22-Nov-96
F-FUI-05130	test	verified passed	22-Nov-96
F-FUI-06100	test	failed	21-Nov-96
F-FUI-06105	demo	verified passed	22-Nov-96
F-FUI-06110	demo	verified passed	22-Nov-96
F-FUI-06300	demo	verified passed	21-Nov-96
F-FUI-06305	demo	verified passed	21-Nov-96
F-FUI-06315	test	verified passed	21-Nov-96
F-FUI-06320	test	verified passed	21-Nov-96
F-FUI-06335	demo	un-verified	22-Nov-96
F-FUI-06337	demo	verified passed	25-Nov-96
F-FUI-06360	demo	verified passed	21-Nov-96
F-FUI-06365	demo	verified passed	21-Nov-96
F-FUI-06370	demo	verified passed	21-Nov-96
F-FUI-06375	demo	verified passed	21-Nov-96
F-FUI-06385	test	verified passed	21-Nov-96
F-FUI-06390	test	verified passed	21-Nov-96
F-FUI-06395	test	partially verified	21-Nov-96
F-FUI-06400	test	un-verified	22-Nov-96
F-FUI-06405	test	un-verified	22-Nov-96
F-FUI-06410	test	partially verified	21-Nov-96
F-FUI-06415	demo	verified passed	21-Nov-96
F-FUI-06420	demo	verified passed	21-Nov-96
F-FUI-06425	demo	verified passed	21-Nov-96
F-FUI-06430	demo	verified passed	21-Nov-96
F-FUI-06435	demo	verified passed	21-Nov-96
F-FUI-06440	demo	verified passed	21-Nov-96

F-FUI-06445	demo	failed	21-Nov-96
F-FUI-06450	demo	verified passed	21-Nov-96
F-FUI-06455	demo	verified passed	21-Nov-96
F-FUI-06460	demo	failed	21-Nov-96
F-FUI-07135	demo	un-verified	13-Nov-96
F-FUI-07140	test	verified passed	13-Nov-96
F-FUI-07205	demo	verified passed	13-Nov-96
F-FUI-07210	test	verified passed	13-Nov-96
F-FUI-07225	demo	partially verified	13-Nov-96
F-FUI-07230	demo	partially verified	13-Nov-96
F-FUI-07235	demo	verified passed	13-Nov-96
F-FUI-07240	demo	verified passed	13-Nov-96
F-FUI-07335	demo	verified passed	15-Nov-96
F-FUI-07340	demo	verified passed	15-Nov-96
F-FUI-07350	demo	failed	15-Nov-96
F-FUI-07355	demo	failed	15-Nov-96
F-FUI-07380	demo	failed	15-Nov-96
F-FUI-07385	demo	failed	15-Nov-96
F-FUI-07390	demo	failed	15-Nov-96
F-FUI-07391	demo	failed	15-Nov-96
F-FUI-07392	demo	verified passed	15-Nov-96
F-FUI-07398	test	failed	15-Nov-96
F-FUI-07410	demo	partially verified	14-Nov-96
F-FUI-07700	test	failed	12-Nov-96
F-FUI-08100	test	verified passed	12-Nov-96
F-FUI-09100	test	partially verified	20-Nov-96
F-FUI-09105	demo	verified passed	20-Nov-96

F-FUI-09110	demo	verified passed	22-Nov-96
F-FUI-09120	test	verified passed	20-Nov-96
F-FUI-09125	demo	verified passed	20-Nov-96
F-FUI-09130	demo	verified passed	20-Nov-96
F-FUI-09170	demo	verified passed	20-Nov-96
F-FUI-09600	demo	verified passed	12-Nov-96
F-FUI-09605	demo	partially verified	12-Nov-96
F-FUI-09610	analysis	verified passed	12-Nov-96
F-FUI-09615	demo	verified passed	12-Nov-96
F-FUI-09620	demo	verified passed	12-Nov-96
F-FUI-09625	demo	verified passed	12-Nov-96
F-FUI-09630	demo	verified passed	12-Nov-96
F-FUI-09635	test	verified passed	12-Nov-96
F-FUI-09710	test	verified passed	13-Nov-96
F-FUI-12610	demo	failed	13-Nov-96
F-FUI-17200	test	verified passed	13-Nov-96
F-FUI-17600	test	partially verified	12-Nov-96
F-FUI-17700	test	verified passed	13-Nov-96
F-HRD-00010	inspection	verified passed	11-Nov-96
F-HRD-00015	inspection	verified passed	11-Nov-96
F-HRD-00020	inspection	verified passed	11-Nov-96
F-HRD-00025	inspection	verified passed	11-Nov-96
F-HRD-00030	inspection	verified passed	11-Nov-96
F-HRD-00035	inspection	verified passed	11-Nov-96
F-HRD-00040	inspection	verified passed	11-Nov-96
F-HRD-00045	inspection	verified passed	11-Nov-96
F-HRD-00050	inspection	verified passed	11-Nov-96

F-HRD-00055	inspection	verified passed	11-Nov-96
F-HRD-00060	inspection	verified passed	11-Nov-96
F-HRD-00065	inspection	verified passed	11-Nov-96
F-HRD-00070	inspection	verified passed	11-Nov-96
F-HRD-00075	inspection	verified passed	11-Nov-96
F-HRD-00085	inspection	partially verified	11-Nov-96
F-HRD-00090	inspection	verified passed	11-Nov-96
F-HRD-00095	inspection	verified passed	11-Nov-96
F-HRD-00100	inspection	verified passed	11-Nov-96
F-HRD-01005	inspection	verified passed	11-Nov-96
F-HRD-01010	inspection	verified passed	11-Nov-96
F-HRD-01015	inspection	partially verified	11-Nov-96
F-HRD-01020	inspection	verified passed	11-Nov-96
F-HRD-01025	inspection	verified passed	11-Nov-96
F-HRD-01030	inspection	verified passed	11-Nov-96
F-HRD-01035	inspection	verified passed	11-Nov-96
F-HRD-01040	inspection	verified passed	11-Nov-96
F-HRD-01045	demo	verified passed	11-Nov-96
F-HRD-02005	inspection	failed	11-Nov-96
F-HRD-02010	inspection	verified passed	11-Nov-96
F-HRD-02015	inspection	verified passed	11-Nov-96
F-HRD-02020	inspection	verified passed	11-Nov-96
F-HRD-02025	inspection	verified passed	11-Nov-96
F-HRD-02030	inspection	verified passed	11-Nov-96
F-HRD-02035	inspection	verified passed	11-Nov-96
F-HRD-02040	inspection	verified passed	11-Nov-96
F-HRD-02045	inspection	verified passed	11-Nov-96

F-HRD-02050	inspection	verified passed	11-Nov-96
F-HRD-02070	inspection	verified passed	11-Nov-96
F-HRD-02075	inspection	failed	11-Nov-96
F-HRD-02080	inspection	verified passed	11-Nov-96
F-HRD-02090	inspection	partially verified	11-Nov-96
F-HRD-02095	inspection	verified passed	11-Nov-96
F-HRD-02100	inspection	verified passed	11-Nov-96
F-HRD-02105	inspection	verified passed	11-Nov-96
F-HRD-03005	inspection	verified passed	11-Nov-96
F-HRD-03010	demo	verified passed	11-Nov-96
F-HRD-03020	inspection	verified passed	11-Nov-96
F-HRD-03025	inspection	verified passed	11-Nov-96
F-HRD-03030	demo	verified passed	11-Nov-96
F-HRD-03035	demo	partially verified	11-Nov-96
F-HRD-03040	inspection	failed	11-Nov-96
F-HRD-03045	inspection	failed	11-Nov-96
F-HRD-04015	demo	verified passed	11-Nov-96
F-HRD-04025	demo	verified passed	11-Nov-96
F-HRD-04030	inspection	verified passed	11-Nov-96
F-HRD-05005	demo	verified passed	11-Nov-96
F-HRD-05010	inspection	un-verified	11-Nov-96
F-HRD-05015	analysis	verified passed	11-Nov-96
F-HRD-06005	demo	verified passed	11-Nov-96
F-HRD-06010	test	partially verified	11-Nov-96
F-HRD-07017	inspection	verified passed	11-Nov-96
F-HRD-07020	inspection	verified passed	11-Nov-96
F-HRD-07025	inspection	verified passed	11-Nov-96

F-PAS-00200	test	verified passed	13-Nov-96
F-PAS-00205	test	verified passed	13-Nov-96
F-PAS-00210	test	verified passed	13-Nov-96
F-PAS-00215	test	verified passed	13-Nov-96
F-PAS-00220	test	verified passed	13-Nov-96
F-PAS-00300	test	verified passed	13-Nov-96
F-PAS-00310	test	verified passed	13-Nov-96
F-PAS-00315	test	verified passed	13-Nov-96
F-PAS-00330	test	verified passed	13-Nov-96
F-PAS-00350	test	verified passed	13-Nov-96
F-PAS-00400	test	verified passed	13-Nov-96
F-PAS-00405	test	verified passed	13-Nov-96
F-PAS-00415	test	verified passed	13-Nov-96
F-PAS-00500	test	verified passed	13-Nov-96
F-PAS-00503	test	verified passed	13-Nov-96
F-PAS-00505	test	verified passed	13-Nov-96
F-PAS-00600	test	verified passed	14-Nov-96
F-PAS-00605	test	verified passed	14-Nov-96
F-PAS-00610	test	verified passed	14-Nov-96
F-PAS-00820	test	verified passed	14-Nov-96
F-PAS-01000	test	verified passed	14-Nov-96
F-PAS-10100	demo	verified passed	14-Nov-96
F-PAS-10300	demo	verified passed	14-Nov-96
F-PAS-10535	test	verified passed	14-Nov-96
F-RMS-00010	demo	partially verified	12-Nov-96
F-RMS-00020	demo	verified passed	12-Nov-96
F-RMS-00035	test	verified passed	12-Nov-96

F-RMS-00040	test	verified passed	12-Nov-96
F-RMS-00050	test	verified passed	12-Nov-96
F-RMS-00060	test	verified passed	12-Nov-96
F-RMS-00070	test	verified passed	12-Nov-96
F-RMS-00130	test	verified passed	12-Nov-96
F-RMS-01010	test	verified passed	20-Nov-96
F-RMS-01020	demo	verified passed	20-Nov-96
F-RMS-01030	test	verified passed	20-Nov-96
F-RMS-04020	demo	verified passed	13-Nov-96
F-RMS-04100	demo	verified passed	13-Nov-96
F-RMS-04110	demo	verified passed	13-Nov-96
F-TLM-00110	demo	verified passed	13-Nov-96
F-TLM-00135	demo	verified passed	13-Nov-96
F-TLM-00210	test	verified passed	13-Nov-96
F-TLM-00215	test	partially verified	13-Nov-96
F-TLM-00220	test	verified passed	13-Nov-96
F-TLM-00410	test	verified passed	13-Nov-96
F-TLM-00440	test	verified passed	13-Nov-96
F-TLM-00445	test	verified passed	13-Nov-96
F-TLM-00450	test	partially verified	13-Nov-96
F-TLM-00490	test	verified passed	13-Nov-96
F-TLM-00510	test	verified passed	13-Nov-96
F-TLM-00515	test	verified passed	13-Nov-96
F-TLM-00525	test	verified passed	19-Nov-96
F-TLM-00530	test	verified passed	19-Nov-96
F-TLM-00610	demo	partially verified	13-Nov-96
F-TLM-00620	test	verified passed	13-Nov-96

F-TLM-00625	test	verified passed	13-Nov-96
F-TLM-00635	test	verified passed	13-Nov-96
F-TLM-00710	test	verified passed	25-Nov-96
F-TLM-00715	test	verified passed	25-Nov-96
F-TLM-00720	test	un-verified	25-Nov-96
F-TLM-00725	test	verified passed	25-Nov-96
F-TLM-00730	test	verified passed	25-Nov-96
F-TLM-00735	test	verified passed	25-Nov-96
F-TLM-00910	test	verified passed	19-Nov-96
F-TLM-00935	test	verified passed	19-Nov-96
F-TLM-00945	test	failed	19-Nov-96
F-TLM-00960	test	un-verified	19-Nov-96
F-TLM-01010	demo	verified passed	15-Nov-96
F-TLM-01015	test	verified passed	15-Nov-96
F-TLM-01040	demo	verified passed	15-Nov-96
F-TLM-01055	test	verified passed	15-Nov-96
F-TLM-01110	demo	verified passed	15-Nov-96
F-TLM-01115	demo	verified passed	15-Nov-96
F-TLM-01125	test	partially verified	15-Nov-96
F-TLM-01135	test	verified passed	15-Nov-96
F-TLM-01140	test	failed	15-Nov-96
F-TLM-01410	demo	partially verified	14-Nov-96
F-TLM-01420	demo	verified passed	19-Nov-96
F-TLM-01430	demo	verified passed	13-Nov-96
F-TLM-10130	demo	verified passed	13-Nov-96
F-TLM-10410	demo	verified passed	13-Nov-96
F-TLM-10415	test	verified passed	13-Nov-96



F-TLM-10425	test	verified passed	13-Nov-96
F-TLM-10435	test	verified passed	13-Nov-96
F-TLM-10440	demo	partially verified	22-Nov-96
F-TLM-10445	test	verified passed	19-Nov-96
F-TLM-10455	test	partially verified	13-Nov-96
F-TLM-10465	test	partially verified	22-Nov-96
F-TLM-10475	demo	verified passed	13-Nov-96
F-TLM-10490	demo	partially verified	22-Nov-96
F-TLM-10525	test	verified passed	19-Nov-96
F-TLM-10955	test	verified passed	19-Nov-96

# Abbreviations and Acronyms

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AGS	Aster Ground System
AM	Morning (ante meridiem) --see EOS AM
ANA	Analysis
AOS	Acquisition of Signal
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer (formerly ITIR)
ATC	Absolute Time Command
ATO	Acceptance Test Organization
BAP	Baseline Activity Profile
CAC	Command Activity Controller
CCB	Configuration Control Board
CCSDS	Consultative Committee for Space Data Systems
CDRL	Contract Data Requirements List
CERES	Clouds and Earth's Radiant Energy System
CI	Configuration item
CLCW	Command Link Control Words
CM	Configuration Management
CMD	Command
CMS	Command Management System
COTS	Commercial Off-The-Shelf
CSCI	Computer software configuration item
CSMS	Communications and System Management Segment
CSR	Consent to Ship Review
CSS	Communications Subsystem (CSMS)
CTIU	Command and Telemetry Interface Unit
DAR	Data Acquisition Request

DAS	Detailed Activity Schedule
DB	Database
DBA	Database Administrator
DBMS	Database Management System
DDTS	Distributed Defect Tracking System
DFCD	Data Format Control Document
DID	Data item description; data ingest/distribution
DMS	Data Management Subsystem
DSN	Deep Space Network
DSS	Decision Support System
EASE	Expert Advisor State Equation
Ebnet	EOS Backbone Network
ECL	ECS Command Language
ECOM	EOS Communications
ECS	EOSDIS Core System
EDF	ECS Development Facility
EDOS	EOS Data and Operations System
EDU	EDOS Data Unit
EOC	EOS Operations Center
EOS	Earth Observing System
EOSDIS	EOS Data and Information System
ETS	EOSDIS Test System
EU	Engineering Unit
EVT	Event
FDF	Flight Dynamics Facility
FIFO	First In - First Out
FMG	File Management
FOS	Flight Operations Segment (ECS)
FOT	Flight Operations Team

FUI	FOS User Interface
GCMR	Ground Configuration Message Request
HGA	High Gain Antenna
HRD	Hardware
I&T	Integration and Test
ICC	Instrument Control Center
IP	International Partners
IRD	Interface requirements document
IST	Instrument Support Toolkit
JPL	Jet Propulsion Laboratory
LAN	Local Area Network
LaRC	Langley Research Center
LMC	Lockheed Martin Corporation
LOS	Loss of Signal
LSM	Local System Manager
LTIP	Long Term Instrument Plan
LTSP	Long Term Science Plan
M&O	Maintenance and Operations
MISR	Multi-Angle Imaging SpectroRadiometer
MO&DSD	Mission Operations and Data System Directorate (GSFC Code 500)
MODIS	Moderate Resolution Imaging Spectrometer
MOPITT	Measurements of Pollution in the Troposphere
MSS	Management and Subsystem (part of CSMS)
MTPE	Mission to Planet Earth
Nascom	NASA Communications Network
NASDA	National Space Development Agency (Japan)
NCC	Network Control Center
NCR	Non-Conformance Report
NOAA	National Oceanic and Atmospheric Administration

OASIS	Operations and Science Instrument Support
ODB	Operational Database
ODM	Operational Data Message
PAS	Planning and Scheduling
PDB	Project Data Base
PI	Principal Investigator
PI/TL	Principal Investigator/Team Leader
PROC	Procedure
QA	Quality Assurance
RBR	Requirements by Release
RCM	Real-Time Contact Management
RCTD	Return Channel Time Delay
RMA	Reliability, Maintainability, Availability
RRR	Release Readiness Review
RTCS	Relative Time Command Sequence
RTS	Relative Time Sequence
SCC	Spacecraft Controls Computer
SCF	Science Computing Facility
SCT	Spacecraft Time
SDVF	SMC Service Management Center
SDPS	Science Data Processing System
SN	Space Network
SSIM	Spacecraft Simulator
SSR	Solid State Recorder
TD	Target Day
TDRS	Tracking and Data Relay Satellite
TDRSS	Tracking and Data Relay Satellite System
TL	Team Leader
TLM	Telemetry

TOO	Target of Opportunity
TRR	Test Readiness Review
TTM	Time Transfer Message
TW	Target Week
USCCS	User Spacecraft Clock Calibration System
UPS	User Planning System
UTC	Universal Time Coordinated
UI	User Interface
WAN	Wide Area Network
WOTS	Wallops Orbital Tracking System